

# GUIDELINES FOR ICSSC POST-EARTHQUAKE RESPONSE ACTIVITIES

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Gaithersburg, MD 20899**

**March 1985**

**Prepared for use by:**

**Interagency Committee on Seismic Safety in Construction**

**Sponsored by:**

**Federal Emergency Management Agency  
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**U.S. DEPARTMENT OF COMMERCE, Malcolm Baldrige, *Secretary***  
**NATIONAL BUREAU OF STANDARDS, Ernest Ambler, *Director***

## ABSTRACT

The National Plan for Federal Response to a Catastrophic Earthquake is reviewed and actions that can be taken by the Interagency Committee on Seismic Safety in Construction (ICSSC) in support of the National Plan are identified. An essential element in the development of earthquake hazard reduction measures for use in Federal construction programs is the detailed assessment of geologic, seismological and engineering factors through post-earthquake investigations. It is concluded that many of the problems and much of the cost associated with the planning for post-earthquake investigations can be avoided by making ICSSC response activities an integral part of the National Plan. This approach can provide valuable technical assistance to Federal agencies adversely affected by a catastrophic earthquake and to those agencies responsible for implementing the National Plan. Steps that must be taken by the ICSSC to establish a workable response structure and to ensure the timely conduct of post-earthquake investigations are outlined.

Key Words: Buildings; codes; design criteria; disasters; earthquakes; seismicity; structural engineering.

## EXECUTIVE SUMMARY

This report addresses the issue of post-earthquake investigations and the actions that the Interagency Committee on Seismic Safety in Construction (ICSSC) can take in support of such investigations following a catastrophic earthquake. It is believed that the assessment of geologic and seismological phenomena and structural performance, coupled with certain in-depth studies carried out by the ICSSC, will be of significant value in the development of improved design standards and construction practices within the Federal community.

Based on a review of current plans and procedures for conducting post-earthquake investigations, it is concluded that the effort required to maintain an independent response plan that can be expected to function satisfactorily nationwide is beyond the capabilities of the ICSSC. Only by making post-earthquake investigations an integral part of the National Plan for Federal Response to a Catastrophic Earthquake does such an undertaking become realistic. The potential benefits to be derived from this integration are substantial. First, timely information on the location and extent of earthquake damage will be more readily available to ICSSC. Second, the problems of obtaining access to the affected area, providing logistical support for field investigation teams and establishing communications between office and field will be greatly reduced. Third, the integrated scientific and engineering expertise of the ICSSC can be made available to those Federal agencies adversely affected by an earthquake and to those Federal officials who have the responsibility for carrying out the National Plan in the event of a catastrophic earthquake.

The organization and response structure of the National Plan are summarized in this report. Of the 13 emergency support functions (ESFs) that make up the plan, ESF 12 (Damage Reconnaissance and Assessment) assigns responsibilities to the ICSSC. While the earliest phase of the Federal response effort will involve a very broad and general assessment of earthquake damage, this activity will become more sharply focused with time and will increasingly involve the ICSSC as specific damage sites and individual structures are assessed. In addition, it is anticipated that the ICSSC will respond to requests for technical assistance directed through the Emergency Information Coordination Center (EICC) at FEMA Headquarters or to requests directed through the Federal Coordinating Officer (FCO) in the field. It is likely that the majority of such requests will originate with Federal agencies whose facilities have suffered damage.

This report describes the alerting system and response structure of the National Plan. The report also outlines those actions that the ICSSC must take to ensure support of headquarters activities and the timely deployment of a field team in the event that the National Plan is implemented. The required actions are as follows:

- Provide FEMA with a list of primary contacts and alternates for staffing of emergency support functional group 12 at FEMA Headquarters.
- Establish a core group within the ICSSC to develop and carry out a response training exercise in conjunction with the combined headquarters/field training exercise designed to test the National Plan and currently scheduled for June 18-20, 1985.
- Maintain within the ICSSC Operations Manual a list of member agency contacts with authority to represent their agency in matters concerned with ICSSC post-earthquake response activities.



- o Maintain a list of agency contacts who can serve in a technical capacity. This list should include both agency headquarters staff and field office staff who would be able to serve on ICSSC field teams, provide technical support for ESFG 12, and participate in any in-depth post-earthquake studies that the ICSSC may commission.
- o With the guidance of FEMA Headquarters, establish contact with FEMA Regional Directors and their State Government counterparts in those regions where damaging earthquakes are likely to occur. An understanding of regional response plans and the objectives of ICSSC post-earthquake activities should facilitate access and should increase the effectiveness of the ICSSC field team in the event of a catastrophic earthquake.
- o With the assistance of organizations such as the National Conference of States on Building Codes and Standards (NCSBCS) and the Association of Major City Building Officials (AMCBO), establish contacts with key local government building officials

Critical to the success of ICSSC post-earthquake response activities will be the development of close working relationships with groups such as the Earthquake Engineering Research Institute and the National Research Council's Committee on Natural Disasters whose role in post-earthquake studies following a catastrophic earthquake will be far broader than that of the ICSSC. Of equal importance will be the coordination of ICSSC activities with those of Federal agencies such as USGS, DOT, NRC and DOE who are responsible for specific post-earthquake tasks as part of their agency mission.

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## INTRODUCTION

Given the large number of facilities throughout the United States that are owned, leased, or assisted by the Federal Government, it is highly probable that any earthquake occurring within the United States and causing widespread damage will directly and adversely affect property and operations of the Federal Government. Thus, in addition to becoming involved with post-disaster assistance and long-term recovery of the affected area, the Federal Government will itself be a victim with an immediate need for expert advice regarding the continued use or evacuation of its facilities, actions that can be taken to limit damage, and mitigation strategies that can be incorporated in the recovery process. In many cases Federal facilities will be relied upon to provide emergency shelter or to serve other critical post-disaster functions. Equally important in the event of a damaging earthquake is the timely assessment of the performance of Federal facilities subjected to strong ground shaking and the subsequent distribution and use of this information for the improvement of engineering design standards and construction practices.

It is the purpose of this document to examine current plans for Federal post-earthquake response and to identify and recommend actions that the Inter-agency Committee on Seismic Safety in Construction (ICSSC) can take in support of those plans. Both short- and long-term objectives of ICSSC post-earthquake activities are described, along with the response structure necessary to achieve them. The major functions of ICSSC would include providing technical assistance to affected Federal agencies and collecting valuable information on geologic and seismological phenomena and on structural performance.

## BACKGROUND

Most local jurisdictions, whether they be municipal or county governments, have within their organizational structure an office with the responsibility for directing emergency operations in the event of a natural disaster. Some jurisdictions maintain very detailed disaster response plans that have been developed and refined on the basis of drills and/or actual experience with natural disasters. In the case of earthquakes, a number of states have established seismic safety organizations for the purpose of promoting seismic safety through education of the public concerning seismic risk and through programs promoting the improvement of building codes and construction practices.

As is appropriate, earthquake disaster response plans stress those actions that are concerned with saving lives, providing emergency care and shelter, and limiting the extent of the disaster. Generally these plans recognize the need for a speedy assessment of damage, identification of those structures that constitute a hazard, identification of buildings suitable for public shelters, emergency repairs to critical facilities, and restoration of essential public services. However, the detailed assessment of geologic and seismological phenomena causing damage and the assessment of the performance of buildings and other structures through post-earthquake investigations is not an element of most response plans, even though it can be demonstrated that the potential impact of such investigations on earthquake hazard reduction is enormous.

Only in the case of California has there been a concerted effort to provide for post-earthquake investigations in developing a state-wide earthquake disaster response plan. Guides for the planning and conduct of post-earthquake investigations in California have been prepared by the Earthquake Engineering Research Institute (EERI) [1]. Recommendations for implementing these guides outside of California

are contained in reference 2. The EERI planning and field guides are based in large part on experience gained from the San Fernando Earthquake of 1971 and they have yet to be tested in a domestic earthquake causing a similar level of damage. For earthquakes occurring within the State of California, the planning guide contains very detailed procedures for the organization and deployment of investigative teams and for the coordination of post-earthquake investigation activities with State and local authorities. This approach necessarily entails a continual updating of lines of responsibility and key contacts in the government, academic, and private sectors. Based on experience to date, it is questionable whether this level of planning and preparation can be applied successfully nationwide. The EERI field guides have been tested in a number of very destructive foreign earthquakes such as the 1980 El-Asnam, Algeria and the 1980 Campania-Basilicata, Italy earthquakes [3,4].

With regard to Federal response to earthquakes, the Interagency Coordination Committee, through its Subcommittee on Federal Earthquake Response Planning, has prepared a planning guide [5] that addresses the preparation of both national and regional Federal plans for response to a catastrophic earthquake. Details of this activity are discussed later. Currently, there is no Federal plan in existence for the coordinated and systematic conduct of post-earthquake investigations although certain agencies do carry out studies of limited scope that constitute a part of the agency mission. Examples of this include post-earthquake geologic, seismological, and structural damage studies conducted worldwide by the Office of Earthquake Studies, U.S. Geological Survey, damage investigations conducted by the Bridge Division of the Federal Highway Administration, and damage investigations of building structures conducted by the Structures Division of the National Bureau of Standards. Ad hoc post-earthquake engineering studies



(both domestic and foreign) have been carried out by EERI and by the National Research Council's Committee on Natural Disasters with the support of the National Science Foundation.

#### ICSSC PARTICIPATION IN POST-EARTHQUAKE RESPONSE ACTIVITIES

The ICSSC represents Federal departments and independent agencies having responsibility for the design, construction, operation or maintenance of facilities that may pose a hazard to Federal employees or to the general public in the event of a damaging earthquake. Also represented are agencies having responsibility for research and development programs directed at earthquake hazard reduction. Representation on the ICSSC is by policy-level individuals who collectively provide the ICSSC with a wide range of scientific and engineering expertise. The central purpose of the ICSSC is to assist those Federal departments and independent agencies involved with construction to develop and incorporate earthquake hazard reduction measures in their construction-related programs. An essential element in the development of these measures is the assessment of geologic, seismological and engineering factors through post-earthquake investigations.

Because damaging earthquakes occur infrequently in a given region, usually with little or no forewarning, advance preparation is needed. However, it is difficult to be fully prepared for every eventuality. As has been indicated earlier in this document, the development of highly detailed plans for the conduct of post-earthquake investigations may be appropriate for a region of limited extent, but this has not been demonstrated to be a workable approach when applied nationwide. An alternative is the development of a systematic approach to post-earthquake investigations that would build upon and be



supportive of the planning effort now being carried out by the Subcommittee on Federal Earthquake Response Planning. It is expected that this approach can provide for timely response on the part of the ICSSC with a minimum of costly and time-consuming preparedness activities.

In addition to expediting post-earthquake investigations, ICSSC participation in Federal post-earthquake response activities can make available scientific and engineering expertise to be tapped by those agencies adversely affected by a damaging earthquake. It can also serve as a valuable resource for those agencies having responsibility for certain emergency support functions outlined in the National Plan for Federal Response to a Catastrophic Earthquake [6]. This National Plan and its relevance to the objectives of the ICSSC are described in the following paragraphs.

#### PLANNING FOR FEDERAL RESPONSE TO A CATASTROPHIC EARTHQUAKE

Policies and responsibilities for providing supplemental support and assistance to State and local governments in the event of a catastrophic earthquake were set out in a planning guide [5] developed by the Subcommittee on Federal Earthquake Response Planning. The Subcommittee was established under the auspices of the Interagency Coordination Committee (ICC) of the National Earthquake Hazards Reduction Program (NEHRP) and is chaired by the Federal Emergency Management Agency (FEMA) which also has lead agency responsibility for managing and coordinating the efforts of NEHRP. Departments and independent agencies represented on the Subcommittee include the Departments of Agriculture, Defense, Education, Health and Human Services, Interior, and Transportation, the Federal Emergency Management Agency, American Red

Cross, Corps of Engineers, General Services Administration, and the National Communications System.

Planning Assumptions:

Planning for Federal response to a catastrophic earthquake is based on certain assumptions which include the following [5]:

- A catastrophic earthquake will cause large numbers of deaths and injuries and the total destruction of a large percentage of facilities that provide for and sustain human needs.
- The earthquake will occur without warning and at a time of day that will produce a maximum number of casualties, and the maximum possible non-resident population will be present in the affected area.
- Land line communications and life support systems will be severely disrupted or destroyed and access to and from the damaged area may be severely restricted for hours and perhaps days. Secondary events such as fires, tsunamis, landslides, flooding and the release of hazardous materials will be triggered.
- State and local resources will be inadequate to respond to the effects of a catastrophic earthquake.

The development of the National Plan for Federal Response to a Catastrophic Earthquake is predicated on State and local governments being in charge of emergency operations with Federal assistance being supplemental to State and local efforts. In the event of a catastrophic earthquake, immediate Federal response following a Presidential disaster declaration will focus on the saving and protecting of lives and providing for basic human needs. Coordination of Federal response to State and local government requests will be under the

direction of a Federal Coordinating Officer (FCO) whose principal point of contact will be a State Coordinating Officer (SCO) designated by the Governor(s) of the affected State(s). The procedures to be followed in activating and carrying out the National Plan are included in the Basic Plan [6] and in the Emergency Support Functional Annexes [7] described below. Although the emphasis of this planning effort has been on immediate emergency response, other planning initiatives may be taken in the future to address earthquake prediction, initial recovery and long-term restoration/recovery. It is anticipated that the final version of the National Plan, incorporating knowledge gained from combined headquarters/field training exercises, will be published in December, 1985.

#### NATIONAL PLAN FOR FEDERAL RESPONSE TO A CATASTROPHIC EARTHQUAKE

##### Basic Plan:

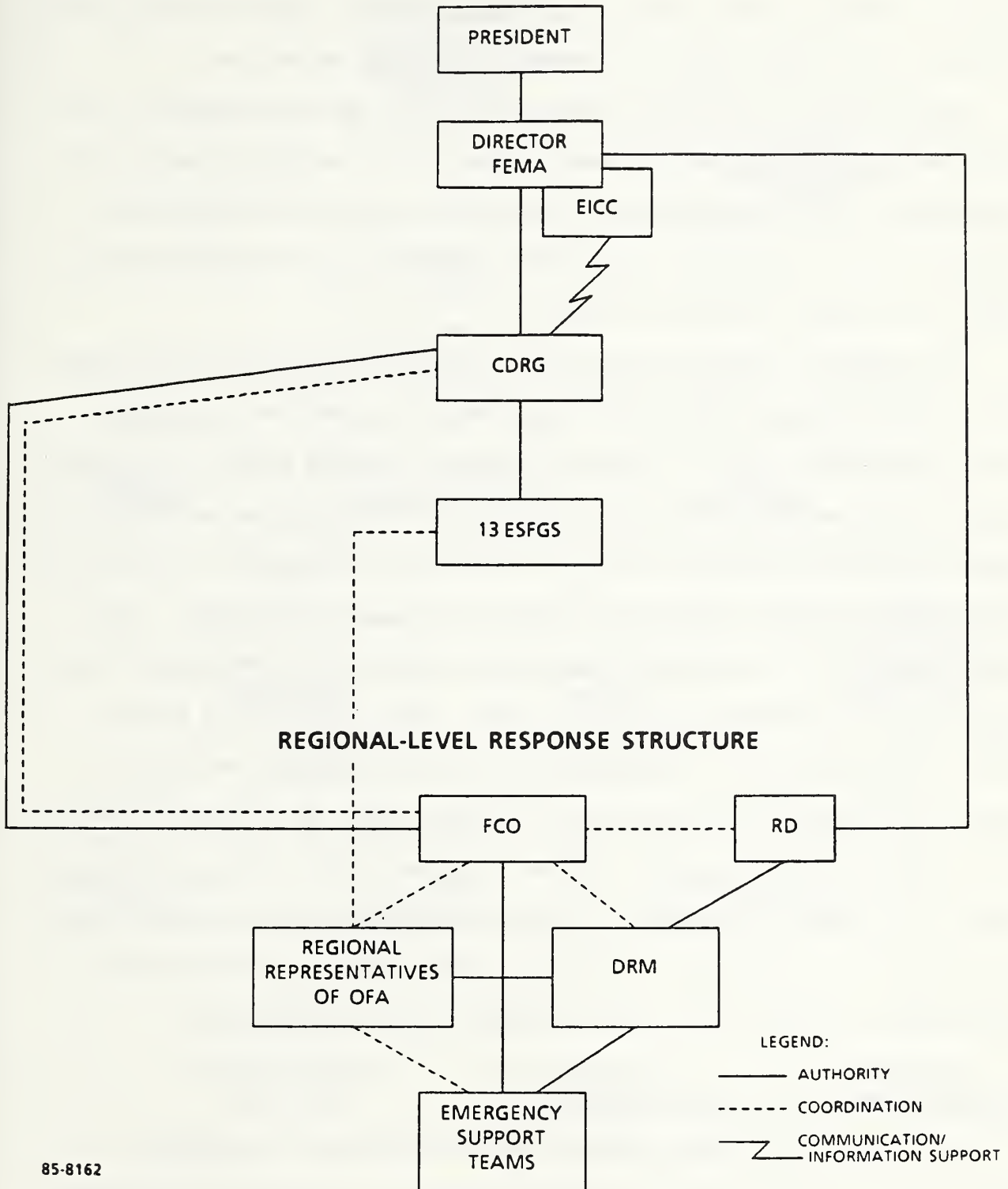
The basic plan is founded on the assumption that a catastrophic earthquake will overwhelm a State's ability to respond effectively to the immediate post-disaster needs of those affected and that the President will immediately declare a major disaster. The plan sets out the response structure, concept of operations, procedures and organizational relationships that will guide the Federal response effort. It provides for the potential involvement and coordinated efforts of 21 Federal departments and agencies in carrying out response activities directed at saving and protecting lives. The plan does not address recovery or reconstruction, nor does it address Federal facilities specifically. Planning for the survival and post-earthquake function of such facilities remains the responsibility of the respective Federal agencies.

### Response Structure and Concept of Operations:

The response structure of the National Plan is outlined in Figure 1. The Director of FEMA has the authority to implement the National Plan and to classify a given earthquake as catastrophic. This action will be taken only after the President declares the affected area a disaster area and appoints an FCO to coordinate Federal support to the State(s). Until the FCO and the Disaster Recovery Manager (DRM) assume their duties in the field, it will be the responsibility of the FEMA Regional Director (RD) to coordinate Federal response activities in support of the State(s) and to implement the regional response plan. It will also be the responsibility of the RD to organize emergency support teams to assist the FCO, calling upon other FEMA regions and other Federal manpower sources as necessary to staff emergency support teams. The DRM will manage the Disaster Field Office (DFO) and will assist the FCO in administering PL 93-288 relief programs and in issuing mission assignments to other Federal agencies.

When requirements for support exceed the affected region's capabilities, these requirements will be forwarded to the national-level response support structure. The national-level response support structure is based upon the concept of "support-by-function" as opposed to "support-by-agency." The response structure consists of a Catastrophic Disaster Response Group (CDRG) and 13 emergency support functional groups (ESFGs). The CDRG is chaired by FEMA and its membership includes emergency coordinators or senior officials from the 24 Federal agencies and volunteer organizations identified in the National Plan. The CDRG serves as the coordinating body through which policy and support requirements are addressed. The CDRG is the central source for the

# NATIONAL-LEVEL RESPONSE SUPPORT STRUCTURE



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Note: Refer to Appendix I for explanation of abbreviations

Figure 1. National- and Regional-Level Response Structure



status of agency actions, both in connection with their specific ESFG functions and with their overall efforts in support of response operations.

Upon implementation of the National Plan, the CDRG will assemble at the FEMA Emergency Information Coordination Center (EICC) and will interact with the ESFGs to satisfy those needs for support that exceed the capabilities existing within the affected region. Some, but not all, of the ESFGs will be physically located in or near the EICC.

The CDRG will function as the overall coordinating body for the national-level Federal response effort while each ESFG will coordinate its specific functional mission with its counterpart emergency support team in the affected region. FEMA regional officials will coordinate the collection and assembly of disaster-related information and will transmit this information to the EICC for dissemination to FEMA officials, the CDRG and members of the ESFGs. Agency representatives on the CDRG will keep other members of the CDRG informed about their agency's earthquake related activities. Also, agency field offices will establish channels of communication with their headquarters offices to keep them informed of field activities performed under the statutory authority of the agency or under missions assigned the agency by the DRM. The CDRG and ESFGs will assemble within two hours after the Federal notification has begun. Initially, these groups will operate on a 24-hour basis. The notification process shown in figure 2 will be initiated through the FEMA EICC.

#### Emergency Support Functional Annexes:

The 13 emergency support functions and the major agency assignments identified in the basic plan are listed in table 1. The agencies represented





# EMERGENCY SUPORT FUNCTIONS (ESF)

1. Emergency Transportation (Surface, Water, Air)
2. Communications
3. Construction Management
4. Fire Suppression
5. Welfare Inquiries
6. (This functional area reserved for future use)
7. Logistical Support
8. Emergency Medical Care
9. Search and Rescue
10. Mortuary Services and Identification of the Dead
11. (This functional area reserved for future use)
12. Damage Reconnaissance and Assessment
13. Emergency Distribution of Food
14. Public Health
15. Mass Care

ESF	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
FEDERAL AGENCIES															
USDA	S	S		P				S	S			S	P		S
DOC				S	S							S			
DOD	S	S	S	S			S	S	P	S		S	S	S	S
DOEd												S			
DOE												S	S		
DHHS					S			P		S			S	P	S
DOI	S	S	S	S					S			S			S
DOJ										S					
DOT	P	S	S					S	S			S	S		
ARC					P			S					S	S	P
COE			P					S	S			S		S	
EPA			S					S							
FEMA	S	S	S	S	S		S	S		P		P	S	S	S
GSA	S	S	S	S	S		P	S		S			S		S
ICC	S														
NCS		P					S					S			
NRC												S			
USPS	S				S										S
VA							S	S		S		S	S		S

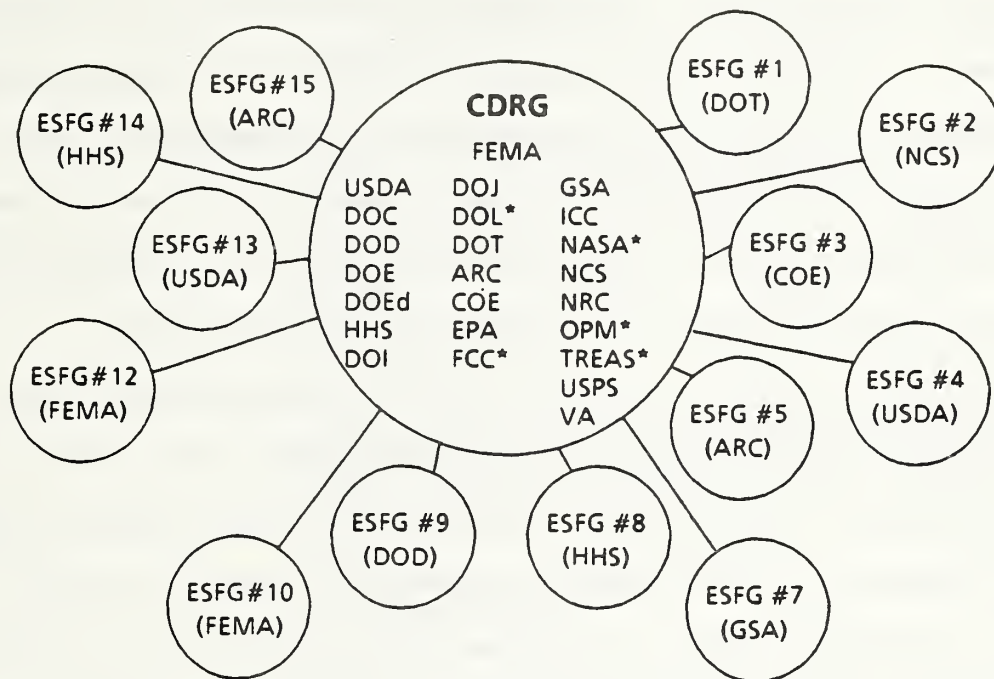
P - Primary agency responsible for coordination of the ESF

S - Agency responsible for supporting the primary agency

Note - In addition to the above agencies, NASA, FCC, OPM, the Department of Labor, and the Department of the Treasury participate in the CDRG

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Table 1. Emergency Support Function (ESF) Assignment Matrix



\* Organizations with response requirements not specifically aligned with ESFs.

#### EMERGENCY SUPPORT FUNCTIONS (ESF)

1. Emergency Transportation (Surface, Water, Air)
2. Communications
3. Emergency Debris Clearance/Temporary Restoration of Essential Public Facilities and Services
4. Fire Suppression
5. Welfare Inquiries
6. Reserved (Not Indicated on Diagram)
7. Logistical Support
8. Emergency Medical Care
9. Search and Rescue
10. Mortuary Services and Identification of the Dead
11. Reserved (Not Indicated on Diagram)
12. Damage Reconnaissance and Assessment
13. Emergency Distribution of Food
14. Public Health
15. Mass Care

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Note: Refer to Appendix I for explanation of abbreviations

Figure 3. National-Level Support Structure: CDRG and the ESFGs

on the CDRG and the agencies assigned primary responsibility for the conduct of the emergency support functions are shown in figure 3.

A detailed description of each emergency support function, the agency having primary responsibility, the supporting agencies, the concept of operations and the resource requirements can be found in the emergency support functional annexes [7]. Assignment of primary responsibility has been made on the basis of greatest overall capability and/or the agency's experience in the functional area associated with a given emergency support function.

The Interagency Committee on Seismic Safety in Construction has been tasked to provide technical support for emergency support function No. 12 - Damage Reconnaissance and Assessment. A description of this emergency support function is included in this document as appendix II. Under the current arrangement, the National Bureau of Standards (NBS) will serve as the ICSSC point of contact in the notification process following a decision to implement the National Plan. NBS will also provide manpower to represent the ICSSC on ESFG 12 during the early stages of the response activity.

#### Likely Sequence of Events Leading to Implementation of the National Plan:

In order to provide the reader with some sense of the timing involved with implementation of the National Plan following a catastrophic earthquake, major events that are likely to occur within the first 12 hours and are relevant to ICSSC post-earthquake activities are presented in the following. Each earthquake will involve a unique set of circumstances and may require actions that depart significantly from those indicated here.

<u>Time (hrs)</u>	<u>Event or Action</u>
0000	<ul style="list-style-type: none"> <li>○ Catastrophic earthquake occurs.</li> </ul>
0010	<ul style="list-style-type: none"> <li>○ FEMA EICC notified by NEIS.</li> <li>○ Appropriate FEMA officials notified, including FEMA regions in or adjacent to affected area.</li> <li>○ NEIS issues preliminary estimate of magnitude and location of epicenter.</li> <li>○ EICC initiates Federal notification process outlined in National Plan.</li> <li>○ Federal agency command and operations centers carry out internal notification and begin to receive information from field offices in or near affected area. This information passed to EICC.</li> <li>○ Wire services report occurrence of strong earthquake and heavy damage.</li> <li>○ NEIS confirms magnitude and location of epicenter.</li> <li>○ ICSSC representatives notified by NEIS and through Federal notification process.</li> <li>○ FEMA RD provides EIC with initial assessment of disaster situation.</li> <li>○ FEMA RD orders implementation of regional response plan.</li> <li>○ Senior FEMA officials recommend a Presidential disaster declaration and implementation of the National Plan.</li> </ul>
0100	<ul style="list-style-type: none"> <li>○ State of emergency declared by Governor(s) of affected state(s) and Presidential disaster declaration requested.</li> <li>○ EICC passes information to ESFGs as they become operational.</li> <li>○ Federal agency headquarters continue to receive and assemble damage information from field offices.</li> <li>○ Strong aftershocks reported by NEIS.</li> <li>○ ICSSC representatives on ESFG 12 arrive at FEMA Headquarters.</li> </ul>



- 0200
  - FEMA RD reports Governor has activated elements of the National Guard.
  - ESFGs become fully operational.
  - ESFG 9 initiates search and rescue support effort.
  - President issues disaster declaration and FEMA Director orders implementation of National Plan.
  - CDRG assesses damage information forwarded by EICC.
  - EICC notifies Federal departments and agencies that National Plan has been implemented.
  - EICC continues to assemble and disseminate damage information obtained from Washington, D.C. headquarters of Federal departments and agencies.
- 0300
  - DOD units provide EICC with initial casualty and damage reports which are passed on to the CDRG and ESFGs.
  - ESFG 12 initiates aerial reconnaissance of affected area.
  - Red Cross field offices report water distribution and systems heavily damaged in a number of areas.
  - FEMA RD requests DOE assistance in areas where hazardous materials are believed to have been released.
  - FEMA RD reports communications system overloaded by incoming calls.
- 0400
  - FEMA regional staff provide EICC with data on damage to buildings and public works installations.
  - TV networks carry live reports from affected area.
  - Disaster field office (DFO) becomes operational.
- 0500
  - FEMA regional staff report state officials concerned about damage to local dams and request Federal assistance in dam inspection.
  - FEMA regional staff relay request from State officials for additional Federal assistance in search and rescue operations.
- 0600
  - EICC receives first report on extent of damage based on aerial reconnaissance.



- NEIS reports additional strong aftershocks.
  - COE requests heavy equipment to assist in removal of debris blocking access to affected area.
  - FEMA RD reports heavy damage to pipelines and electrical distribution systems. Local resources are not adequate to carry out emergency repair.
- 0700
- FEMA regional staff report that numerous large fires in affected area are burning out of control.
  - ESFG 12 initiates second aerial reconnaissance of area.
  - TV coverage continues and includes aerial views of heavily damaged structures.
- 0800
- EICC receives first detailed report on condition of highway and rail lines leading into the affected area. Access by ground very limited.
  - FEMA regional staff relay State request for additional building inspectors. Number required is believed to be several hundred.
- 1000
- EICC receives report on results of second aerial reconnaissance.
  - NEIS reports 8th major aftershock.
- 1200
- FEMA regional staff relay State request for additional cots, blankets and medical supplies.

#### OBJECTIVES OF ICSSC POST-EARTHQUAKE ACTIVITIES

The primary objectives of post-earthquake activities on the part of ICSSC are the detailed study and documentation of 1) earthquake hazards of ground shaking, surface fault rupture and ground failures, and 2) the performance of selected engineering structures subjected to strong ground shaking. The ultimate goal is the utilization of resulting knowledge in the improvement of Federal design standards and construction practices. Ancillary objectives are to provide technical assistance to those Federal Agencies requesting such assistance and to aid the FCO in carrying out the National Plan by providing

support for ESFG 12. Since the post-earthquake activities of the ICSSC will encompass the initial phase of the Federal response to a catastrophic earthquake, it is convenient to categorize ICSSC objectives as either "short term" or "long term."

#### Short-Term Objectives:

The time frame applicable to short-term objectives coincides with the immediate response phase of the National Plan. Objectives during this phase, in priority order, are as follows:

1. Deploy portable instrumentation appropriate for measuring structural response and nearby ground motions due to aftershocks.
2. Assemble information on the location of damaged Federal facilities and other major engineering structures through interaction with the FEMA EICC, with the headquarters of ICSSC member agencies, with other study groups and from observations made by members of the ICSSC field team.
3. If requested, provide technical assistance to Federal agencies whose facilities and operations have been adversely affected by the earthquake. This may include recommendations regarding evacuation, limited operations, emergency repair, etc.
4. Respond to requests for technical assistance by the FCO. Such requests may be conveyed directly to the ICSSC field team, or they may be passed through the national response structure via the CDRG and the ESFGs.
5. Wherever possible, document the performance of major damaged structures that must be razed in order to carry out emergency response functions.

6. Identify those areas of surface faulting, landslides and liquefaction, and those structures (both damaged and undamaged) for which in-depth studies are likely to yield valuable information for the subsequent improvement of Federal design standards and construction practices, for validating analytical models of strong ground motion and structural response, or for establishing new research directions.

Long-term Objectives:

The long-term objectives will require certain in-depth studies to be carried out under joint agency sponsorship. Such studies will likely be completed well after the initial or emergency phase of the National Plan has ended. Long-term objectives include the following:

1. Carry out in-depth studies on the earthquake hazards of ground shaking, surface faulting, ground failures, tectonic deformation and, in certain cases, tsunami run-up.
2. Carry out in-depth studies of those structures that will, in the opinion of the ICSSC, provide information of value to the improvement of Federal design standards and construction practices.
3. Assess the impact of the earthquake on Federal facilities and operations, the effectiveness of steps taken to deal with earthquake damage, and the effectiveness of ICSSC post-earthquake response activities.
4. Promote the collection of information on strong ground motion, structural response, structural performance, repair and retrofit, and the dissemination of this information to member agencies of ICSSC and to other interested organizations.

## RESPONSE STRUCTURE AND CONCEPT OF OPERATIONS

ICSSC post-earthquake activities will be initiated and carried out according to the response structure shown in figure 4. The response structure provides for integration of ICSSC activities with the National Plan and is dependent upon a core group within ICSSC for decision-making and staffing during the emergency stage of the response. Selection of core agencies is based upon agency experience with post-earthquake response activities and the potential for providing technical staff with the expertise required for conducting post-earthquake investigations.

### Initial Actions:

1. In the event of a catastrophic earthquake, initial ICSSC staffing of ESFG 12 at FEMA Headquarters will be automatic since points of contact have already been arranged for in the notification procedure outlined in the National Plan. The ESFGs will become fully operational within 2 hours of the event.
2. The Chairman of the ICSSC will contact policy-level members of the core group to determine the availability of technical staff to serve on the ICSSC field team and to provide backup staffing for ESFG 12 at FEMA Headquarters.
3. Members of the core group will determine the availability of agency technical staff, both within their respective headquarters and within or near the affected region, to serve on the field team and will assess the significance of preliminary damage information transmitted to agency headquarters from field offices within the affected region.

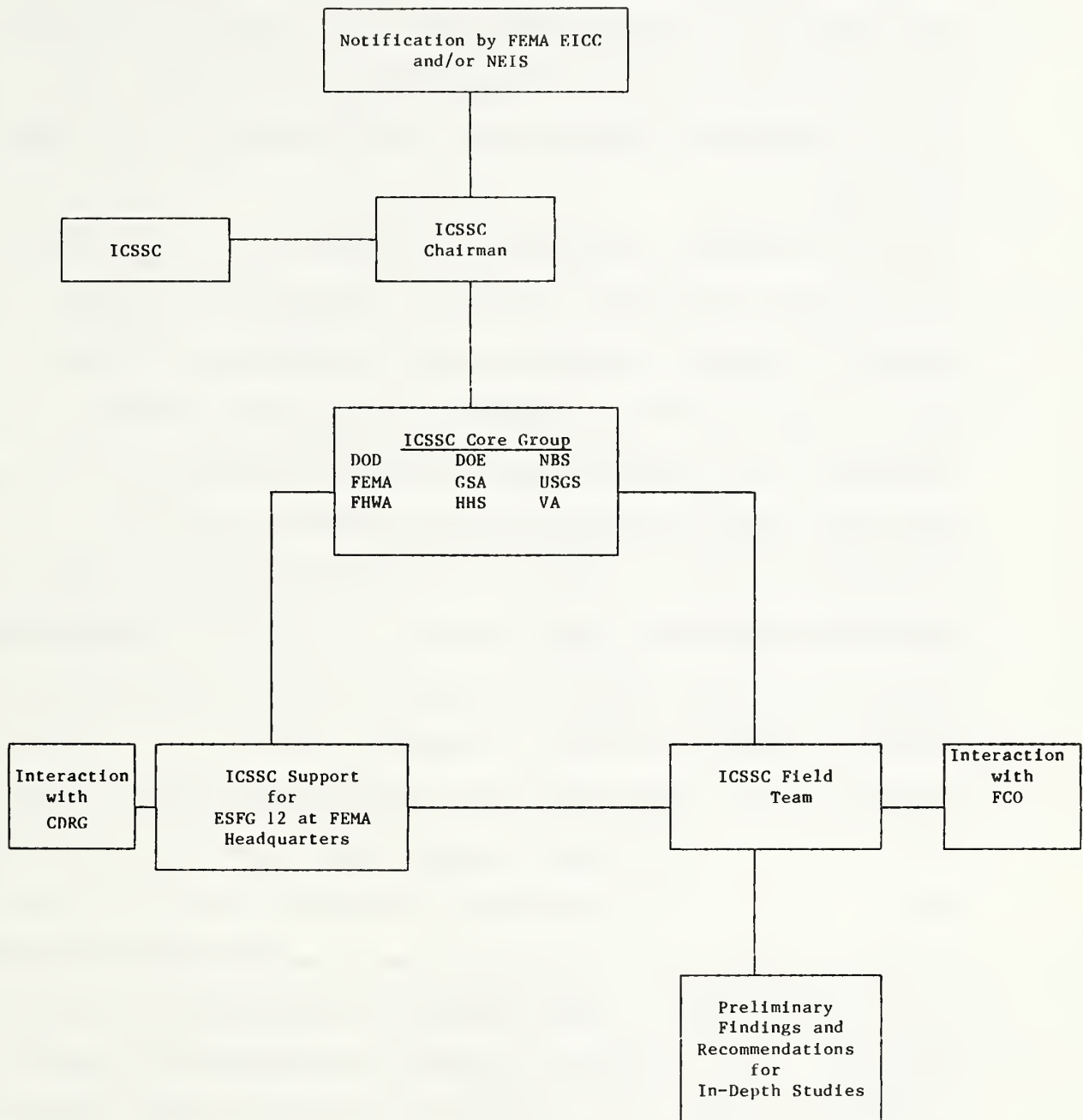


Figure 4. ICSSC Post-Earthquake Response Structure



4. Based on information received from ICSSC representatives to ESFG 12 and from information assembled by members of the core group, the Chairman will designate an ICSSC field team and team leader.
5. The Chairman will inform the CDRG of this action through the ICSSC ESFG representative(s) and will establish contact with appropriate State and local officials regarding access to the affected area by the ICSSC field team.
6. The size and makeup of the field team will depend upon the magnitude of the disaster, the number and nature of requests by the affected agencies for technical assistance, and the availability of technical staff. Because of difficulties that are bound to be encountered regarding access, transportation, subsistence and communication, the size of the team will be kept as small as possible. Initially, the team may be limited to two or three structural engineers, a geotechnical engineer and an earth scientist. It will be the responsibility of this team to make a quick assessment of the damage and inform the Chairman if additional support is required.
7. The Chairman will notify policy-level contacts in those ICSSC agencies not included in the core group of actions taken in response to the earthquake. It will be the responsibility of these policy-level individuals to monitor damage reports within their agency and to inform the Chairman of significant damage to agency facilities and any need for technical assistance. These individuals will also be responsible for alerting technical staff within their agency of the possible need for assistance by ESFG 12, or by the ICSSC field team.



#### Interaction With Other Study Groups:

The effectiveness of post-earthquake investigations depends upon several factors that include early access to the affected area, the timely location and preliminary assessment of damaged structures, and the collection of perishable data that might otherwise be lost with the occurrence of strong aftershocks or during the process of clearing debris and carrying out other emergency operations. Information collected by the EICC will be extremely helpful in identifying areas of concentrated damage and major structures that constitute a serious hazard. However, this information will be fairly sketchy and, in many cases, unreliable. Only by combined air and ground reconnaissance will it be possible to identify those sites that require an immediate assessment by the ICSSC field team.

In order to accelerate the collection of data during the early stages of post-earthquake response and to avoid duplication of effort, interaction with other study groups such as the Earthquake Engineering Research Institute and the National Research Council's committee on Natural Disasters is essential. Establishing a close working relationship with post-earthquake response teams dispatched by Federal agencies such as the USGS, DOT, NRC and DOE can increase the effectiveness of ICSSC post-earthquake activities.

#### USGS Response Activities:

Draft interim emergency plans for USGS earthquake prediction and response activities are described in reference 8. The major elements of these plans and the general response structure are included in this document as appendix III. It is anticipated that these plans and procedures will be revised to reflect USGS responsibilities outlined in the National Plan for Federal Response to a Catastrophic Earthquake. However, authority to implement the prediction and/or

response plans resides with the USGS and implementation is not dependent on activation of the National Plan.

Of primary importance is the USGS Field Studies Group whose mission is to gather scientific data and make field observations commencing as soon as possible after the occurrence of an earthquake. This includes the study of surface faulting, landslides, liquefaction, distribution of damage, tectonic deformation, recording of aftershocks, and the acquisition of strong ground motion records. These records will provide the basis for determining the effects of soil and rock on ground motion and for quantifying amplitude, spectral and temporal characteristics of ground motions. Activities carried out by the Field Studies Group will be coordinated with the activities of other groups and research units involved with post-earthquake studies.

The USGS Hazard Evaluation Group has the responsibility for evaluating geologic hazards associated with the earthquake and its aftershocks. In the event that the National Plan is activated, the Hazard Evaluation Group will provide the FCO and the CDRG with technical assistance while the Field Studies Group will provide valuable input to ESFG 12 (Damage Reconnaissance and Assessment).

Although the USGS interim emergency plans do not include an explicit timetable, a major objective of the Field Studies Group is the establishment of a network of portable field seismographs around the main source region in order to define the zone of rupture and to record major aftershocks. This network should be in place within a few hours of the main event. If the earthquake has been preceded by prediction response activities, portable field seismographs may already be in place at the time of the earthquake.

With effective coordination, the USGS and ICSSC post-earthquake response activities can be mutually supportive. For example, the timely placement of USGS strong motion seismographs in and around buildings and other structures that are of major engineering interest can yield valuable information on the ground motions likely to have been experienced by these structures during the main shock. It will also be possible to obtain data on soil/structure interaction. Finally, the evaluation of structures for post-earthquake function that may include emergency shelter or temporary medical care will involve structural engineering issues as well as an assessment of the likelihood of strong aftershocks and local ground failure.

#### Field Operations:

The following sets out the operating procedures to be followed by the ICSSC field team. Each event will be unique in terms of available support and activities to be carried out. Therefore, the field operating procedures can be outlined only in general terms.

1. The team leader will establish the time and place of assembly of the ICSSC field team.
2. Each agency will be responsible for arranging transportation of its member(s) of the ICSSC field team to the affected area and will assist, wherever possible, in arranging for local transportation and other logistical support required by the field team.
3. The team leader will be responsible for making initial contact with the appropriate State and local authorities in the field and will be responsible for informing the FCO and/or the DRM of the team's presence in the area.

4. It will be the responsibility of the team leader to maintain contact with the ICSSC Chairman, to apprise him of conditions in the affected area, and to alert him regarding needs for additional support.
5. The ICSSC field team will establish contact with other investigative teams in the affected area for the purpose of pooling damage information.
6. All requests by the news media for interviews will be referred to the Joint Information Center (JIC) at the DFO.

#### Communications:

The success of any post-earthquake study will be heavily dependent on effective communication between the field team, the ICSSC Chairman and core group, and the ICSSC representatives assigned to the emergency support functional groups. This is particularly true for the initial phase of the response. If the field team becomes directly involved with field activities under the direction of the FCO, it should be possible to communicate directly with the ESFGs through the EICC at FEMA Headquarters. Short of this, every effort must be made by agency representatives serving on the core group to expedite communications with the field team through agency channels. Obviously, this problem will be less critical after the emergency phase has passed.

#### Reports:

The field team will transmit daily summaries of activities to the chairman and will prepare a reconnaissance report upon completing the initial phase of the ICSSC post-earthquake activity. This reconnaissance report will outline the observed damage and will contain recommendations for the conduct of in-depth studies.

## IN-DEPTH STUDIES

The post-emergency stage with regard to field team activities will depend upon the nature of the disaster and the rate of progress on the part of disaster management officials in bringing the emergency under control. It is anticipated that this stage will commence anywhere from 3 days to 2 weeks after the event. At this point in the response it is anticipated that a majority of the major engineering structures to be considered for further study will have been identified. Some of these structures may be badly damaged and will be in the process of or shortly scheduled for demolition.

Based on information and recommendations provided by the ICSSC field team and information obtained from other sources, the core group will develop a plan for in-depth studies. In developing this plan the core group will consider the possibility of collaborating with other post-earthquake study teams involved with the disaster. The core group will submit the proposed plan of study to the ICSSC membership for consideration and action regarding staffing and funding. Obviously, those studies involving structures scheduled for demolition will have to be carried out in a short time frame and it will not be possible to conduct in-depth studies.

### Scope of Studies:

The scope of studies to be carried out after the emergency phase of the disaster has passed will depend upon a number of factors that include, but may not be limited to the following:

- Degree of access to the structure
- Potential for obtaining information of value in improving design criteria and construction practices
- Cost of conducting the study



- Availability of staff and funding
- Plans for in-depth studies by other post-earthquake study teams.

#### RESPONSE PREPAREDNESS AND PLANNING

As has been noted earlier in this document, the development and maintenance of highly detailed post-earthquake response plans that can be applied nationwide are believed to be beyond the capabilities of the ICSSC. Integration of post-earthquake response activities with the National Plan will relieve the ICSSC of tasks such as maintaining lists of major structures and critical facilities located in earthquake-prone areas, developing lines of communication with those officials having responsibility for administering Federal assistance immediately following a catastrophic earthquake, and the collection from numerous sources of earthquake damage information during the early stages of the event. In fact, the availability of damage information through the EICC should allow the ICSSC to develop specific response plans for a given event far earlier than would otherwise be possible.

Nevertheless, there are a number of tasks that must be carried out by the ICSSC on a continuing basis to ensure an adequate level of preparedness. Undoubtedly, tasks in addition to those outlined here will be identified as the ICSSC post-earthquake response plan develops.

#### ICSSC Member Agency Contacts:

The Secretary of ICSSC should maintain as part of the ICSSC Operations Manual a list of member agency contacts. The list should include the agency office and policy-level individual having authority to represent the agency in matters concerned with ICSSC post-earthquake response activities. Policy issues that are likely to develop in the event of an earthquake include agency



support of ESFG 12, logistical support of the ICSSC field team, access to agency facilities in the affected area, and agency support of in-depth studies of selected structures. A beginning has already been made in developing such a list with the agency contacts required for the preparation of this document.

The Secretary should also maintain as part of the ICSSC Operations Manual a list of agency contacts who can serve in a technical capacity. This should include both agency headquarters staff and field office staff who would be able to serve on ICSSC field teams, provide technical support for ESFG 12, and participate in in-depth studies that the ICSSC may commission following a catastrophic earthquake.

#### Contact With Regional Officials:

By operating within the structure of the National Plan, ICSSC post-earthquake activities can expect to build upon and receive support from other Federal response efforts. However, experience has shown that arrangements previously agreed to and believed to be clearly understood by the parties concerned are not necessarily operative in a disaster situation. Examples of problems that will likely be encountered are the denial of access to the affected area, difficulty in obtaining space on reconnaissance flights even though space may be readily available, and gaining access to the emergency communications system in the field.

The potential for these and other problems interfering with the conduct of ICSSC post-earthquake activities can be reduced by maintaining a working relationship with State and regional Federal authorities who will be responsible for implementing local disaster response plans in the event of a catastrophic earthquake. At a minimum, this should include periodic contact with the FEMA

Regional Directors and their counterparts in the State Governments for those regions in which the occurrence of damaging earthquakes is considered likely. A summary of regional seismic activity and the potential for damaging earthquakes can be found in reference 9. These periodic contacts could involve a briefing on the objectives and operating procedures of the ICSSC post-earthquake response plan, and a review of State and regional Federal earthquake response plans.

The Department of Energy and the U.S. Geological Survey have considerable experience with developing State and regional contacts in the context of post-earthquake activities and this experience could serve as a model for ICSSC planning. Of particular importance in the event of a catastrophic earthquake will be the cooperation and assistance of local government building officials. Existing links with organizations such as the National Conference of States on Building Codes and Standards (NCSBCS) and the Association of Major City Building Officials (AMCBO) should be used to establish these contacts. Additional information of value in post-earthquake response planning can be found in reference 10.

#### Periodic Training Exercises:

Short of an actual earthquake, training exercises involving a scenario of post-earthquake events are probably the most effective means of testing planning assumptions. At the same time, these exercises can provide a learning opportunity for individuals without prior post-disaster experience. A headquarters exercise to test the National Plan for Federal Response to a Catastrophic Earthquake was conducted during the week of August 6, 1984. This will be followed by a combined headquarters/field training exercise scheduled for June 18-20, 1985.

It is recommended that the ICSSC develop and carry out a training exercise in conjunction with the combined headquarters/field exercise in 1985. The general scenario developed by FEMA for its 1984 headquarters exercise, modified to place more emphasis on activities of concern to the ICSSC, can be used for exercise planning. Since many problems will have to be worked out in preparing for the initial exercise, it is recommended that the exercise be limited to those agencies within the core group. However, subsequent exercises should be planned to include the entire membership of ICSSC, thus providing a broader base from which to select team members.

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## APPENDIX I - ABBREVIATIONS

### Departments

### ABBREVIATIONS

<u>USDA</u>	<u>Department of Agriculture</u>
FS	Forest Service
SCS	Soil Conservation Service
<u>DOC</u>	<u>Department of Commerce</u>
CEN	Bureau of the Census
NBS	National Bureau of Standards
<u>DOD</u>	<u>Department of Defense</u>
<u>DOEd</u>	<u>Department of Education</u>
<u>DOE</u>	<u>Department of Energy</u>
<u>HHS</u>	<u>Department of Health and Human Services</u>
FDA	Food and Drug Administration
PHS	Public Health Service
<u>DOI</u>	<u>Department of Interior</u>
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
FWS	Fish and Wildlife Service
NPS	National Park Service
USBR	U.S. Bureau of Reclamation
USGS	U.S. Geological Survey
<u>DOT</u>	<u>Department of Transportation</u>
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FRA	Federal Railroad Administration
MARAD	Maritime Administration
OET	Office of Emergency Transportation
SLSDC	Saint Lawrence Seaway Development Corporation
UMTA	Urban Mass Transportation Administration
USCG	United States Coast Guard

### Agencies

ARC	American Red Cross
COE	U.S. Army Corps of Engineers
EPA	Environmental Protection Agency



FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
<u>GSA</u>	<u>General Services Administration</u>
FSS	Federal Supply Service
PBS	Public Buildings Service
ICC	Interstate Commerce Commission
NASA	National Aeronautics and Space Administration
NCS	National Communications System
NRC	Nuclear Regulatory Commission
USPS	U. S. Postal Service
VA	Veterans Administration
<u>Other</u>	
CDRG	Catastrophic Disaster Response Group
DFO	Disaster Field Office
DRM	Disaster Recovery Manager
EICC	Emergency Information Coordination Center
EOC	Emergency Operations Center
ESF	Emergency Support Function
ESFG	Emergency Support Functional Group
FCO	Federal Coordinating Officer
ICSSC	Interagency Committee on Seismic Safety in Construction
IECG	Interagency Emergency Coordinating Group
JIC	Joint Information Center
NEHRP	National Earthquake Hazards Reduction Program
NEIS	National Earthquake Information Service
RD	Regional Director
SCO	State Coordinating Officer

## **APPENDIX II**

### **Emergency Support Function 12**

#### **Damage Reconnaissance and Assessment**

January 31, 1985

DAMAGE RECONNAISSANCE AND ASSESSMENT ANNEX  
EMERGENCY SUPPORT FUNCTION 12

I. INTRODUCTION

A. Purpose. This annex describes coordinated Federal actions for gathering, collating, and disseminating information on damage following a catastrophic earthquake. Damage reconnaissance and assessment assists State and local officials by providing data necessary for allocating life-saving and life-supporting resources.

B. Scope. This annex is applicable to all Federal departments and agencies with assets for damage reconnaissance and assessment, especially those organizations with aerial reconnaissance and hazard-monitoring capabilities. The damage reconnaissance addressed in this annex will focus on determining the affected area and damage magnitude. For example, the assessment will indicate collapsed buildings or bridges and blocked roads. It will not attempt to assess the impact of that damage in relation to the total transportation infrastructure.

C. Policy Guidance

1. Accepted Policies. The Department of Defense (DoD) will provide assistance in accordance with DoD Directive 3025.1. (Refer to III B 2, this Annex.)

2. Policies Applicable to This Plan. (Require Federal Emergency Management Agency (FEMA) approval/endorsement)

a. The Federal Government will commence air reconnaissance operations of the affected area immediately upon the confirmation of a catastrophic earthquake.

b. The initial focus of damage reconnaissance and assessment will be to identify:

- (1) Boundaries of the disaster area and locations of greatest damage;

- (2) Areas suitable for accommodating evacuees and providing mass care;
- (3) Undamaged transportation arteries into the affected areas; and
- (4) Areas of potential risk because of secondary hazards; e.g., radiological contamination, flooding, etc.

c. A regional damage reconnaissance and assessment group will be organized in the affected FEMA region.

d. The regional response will coordinate Federal assistance to the State to provide support for the conduct of the damage reconnaissance and assessment actions on the ground in the affected area.

e. Only the Joint Information Center (JIC) is authorized to release information to the public dealing with the damage reconnaissance and assessment.

## II. THE SITUATION

A. Disaster Condition. The suddenness and devastation associated with a catastrophic earthquake will result in numerous requests to State and local authorities for help in saving lives and alleviating human suffering. These authorities will require accurate and timely information on which to base their decisions and focus their response actions. The Federal Government possesses reconnaissance assets, unavailable to the State, which can provide State officials with timely, area-wide assessments of the extent of the damage. Following the initial assessment, the Federal Government can support State and local development of more detailed damage assessments.

### B. Assumptions

1. Initially, State and local government officials will focus on coordinating lifesaving activities and reestablishing control of the disaster area. They will be unable to conduct area-wide damage assessments.

2. Initial reports of damage will be fragmented and provide an incomplete picture concerning the extent of the damage.

3. Federal, region, or State officials will request an immediate aerial reconnaissance to determine the overall impact of the earthquake.

4. Weather and other environmental factors may restrict aerial reconnaissance operations, thus requiring repeated efforts to obtain essential information. Such problems could delay completion of a full assessment for several days, but an initial report will be provided no later than 12 hours after the event.

5. Following the initial reconnaissance and assessment, more detailed assessments will be needed regarding the structural integrity of buildings, bridges, and roads. Information regarding other components of the social, economic, and transportation infrastructures also will be required.

6. Aftershocks would necessitate the reevaluation of examined areas.

### III. RESPONSIBILITIES

#### A. Agency with Primary Responsibility

1. The Chief, Public Assistance Division of the State and Local Programs and Support Directorate, FEMA (SL-DA-PA-FEMA) will chair the damage assessment Emergency Support Functional Group (ESFG). This ESFG is responsible for coordinating, integrating, and managing overall Federal efforts to collect, collate, and disseminate damage information.

2. A regional response group will be established in the affected area to coordinate acquisition of Federal resources to satisfy requests of State authorities for assistance in damage reconnaissance and assessment. This group also will pass on to States damage reconnaissance information derived from national assets.

B. Supporting Agencies. The departments and agencies listed below are members of the ESFG. They support damage reconnaissance and assessment activities by providing the ESFG with information and resources.

#### 1. Department of Energy (DoE).

a. Under the Federal Radiological Emergency Response Plan (FRERP), DoE will assist in radiological monitoring and assessments requested by State authorities or cognizant Federal authorities.



b. With aerial measuring systems, including photography and multispectral remote sensing, DoE can provide radiological monitoring and assessment of the affected areas.

c. The Power Administrations will assess energy production, transmission, and distribution systems in their areas of responsibility.

2. DoD. DoD will provide assistance consistent with DoD Directive 3025.1. This includes, but is not limited to:

- (1) Conducting aerial photographic reconnaissance and interpretation,
- (2) Coordination of Civil Air Patrol assets in damage reconnaissance, and
- (3) Providing resources to assist in damage reconnaissance activities throughout the affected area.

3. Corps of Engineers (CoE). The CoE will assess damage to dams, levees, and other Civil Works Programs managed and executed by the Commanding General, US Army Corps of Engineers. In addition, the CoE will assist in other efforts when requested.

4. Department of Transportation (DoT).

a. The US Coast Guard will assess damage to ports, navigable waterways, navigation aids, and other facilities in their jurisdiction.

b. The Federal Aviation Administration (FAA) will provide emergency air traffic control of aircraft involved in the aerial reconnaissance of the affected area. Also, it will assess damage to air navigation aids and report on damage to airfields where FAA personnel are assigned.

c. The Federal Highway Administration will assist in assessing damage to highways, roads, and bridges in the affected area.

d. The Federal Railroad Administration will assist in assessing damage to railroads in the affected area.

e. The Saint Lawrence Seaway Development Corporation will assess damage to the seaway if it is in the affected area.

5. Department of Education (DoEd). DoEd will survey education facilities to assess their viability as mass care or other disaster support facilities.

6. Department of Interior (DoI).

a. The National Park Service will assess damage in and around national park areas. It will be prepared to provide available personnel to participate in other damage reconnaissance as required.

b. The Bureau of Indian Affairs will assess damage in and around Indian reservations.

7. United States Department of Agriculture (USDA). The Forest Service will assess damage to facilities, structures, roads, dams, utilities, and privately owned facilities permitted on national forest lands. Also, when requested by the ESFG, it will provide engineers, technical personnel, and liaison staff to assist in damage reconnaissance.

8. Department of Commerce (DoC). The Interagency Council on Seismic Safety in Construction / National Bureau of Standards (ICSSC/NBS) will dispatch a team of engineers and other scientists to assess structural damage to Federal buildings and other facilities in the affected area. The Federal Coordinating Officer (FCO) could request these personnel to support State and local requirements.

9. Nuclear Regulatory Commission (NRC). The NRC will monitor the status of nuclear materials under its jurisdiction in various activities and facilities, including commercial power reactors.

10. Veterans Administration (VA). The VA will assess damage to its hospitals and other facilities.

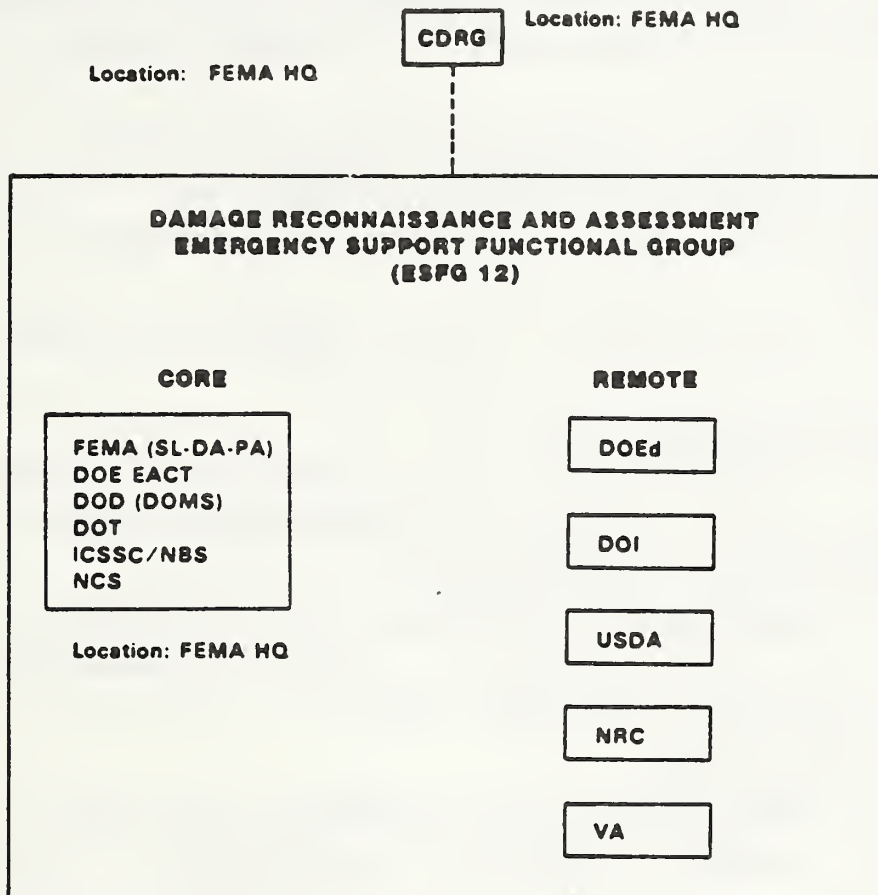
11. National Communications System (NCS). The NCS will provide communications to support damage reconnaissance and assessment activities when required.

#### IV. CONCEPT OF OPERATIONS

##### A. Organization Structure

1. The Damage Reconnaissance and Assessment ESFG will operate under the direction of the Chief, Public Assistance Division. Figure 12.1 depicts the ESFG composition.

## FEDERAL-LEVEL ORGANIZATION



## REGION-LEVEL ORGANIZATION



**NOTE: ALL REQUESTS WILL BE DIRECTED AT THE CORE GROUP**

Figure 12.1. Composition of the Damage Reconnaissance and Assessment Emergency Support Functional Group

2. The Chief, Public Assistance Division will represent the ESFG in its dealings with the Catastrophic Disaster Response Group (CDRG).

3. Those organizations identified as members of the "core" will have a representative present at the operating location on a 24-hour basis. This location will be adjacent to the FEMA Emergency Information Coordination Center (EICC).

4. "Remote" agencies (Figure 12.1) do not require a representative at the group's operating location. However, they will ensure that a representative is available on a 24-hour basis throughout the Immediate Response Phase.

5. SL-DA-PA-FEMA will provide administrative support to the ESFG.

B. Notification Procedure

1. The FEMA EICC will notify the Chief, Public Assistance Division of the decision to implement the National Plan. Other ESFG members will be notified by their parent agencies.

2. Upon notification, all members will report to their working locations. ESFG members designated as "remote" in Figure 12.1 will call the ESFG to inform the group of their location.

C. Initial Actions

1. Upon notification and confirmation, ESFG members will go to the locations indicated in Figure 12.1. The core group will convene within 2 hours following notification.

2. Upon arrival at the group's location in FEMA headquarters, members of the ESFG will:

- (1) Attempt to contact the regional damage reconnaissance and assessment response group at the affected region to receive their initial estimate of the damage;
- (2) Obtain from the EICC the location of the epicenter of the earthquake and possible areas of damage;
- (3) Obtain from the EICC the latest weather report for the disaster area from the National Weather Service including present conditions, the 24-hour forecast, and the long-range forecast; and



- (4) Determine the location of possible sources of secondary hazards in the disaster area; e.g., dams, reactors, nuclear and chemical waste sites, etc.

3. The ESFG will assess the need for aerial reconnaissance and will request member organizations to identify assets for possible aerial reconnaissance missions.

4. The ESFG will estimate the size of the damaged area. Upon making this assessment, the ESFG will request the mission(s) to be flown.

5. As reports arrive at the ESFG's location, they will be processed in accordance with the procedures outlined below under paragraph IV E, Response Management.

6. Members of the ESFG whose parent organizations have been tasked to provide personnel to the disaster area upon request will confirm the alerting of those personnel.

#### D. Functions and Subfunctions

1. Collate damage reconnaissance reports from multiple sources.
2. Disseminate damage reconnaissance information to the concerned Federal and State officials.
3. Be prepared to direct subsequent aerial reconnaissance missions.
4. Be prepared to provide assistance to State officials through the regional damage reconnaissance and assessment element.

#### E. Response Management

1. Information derived from the initial aerial reconnaissance missions will be forwarded immediately to the affected region, the CDRG, and the FEMA EICC. If an affected region cannot be reached, the information will be forwarded to the regional headquarters assuming its responsibilities.

2. During the first 72 hours following the earthquake, the ESFG will provide reconnaissance and assessment updates at 6-hour intervals to the affected region, the CDRG, and the FEMA EICC. Critical information will be passed; the ESFG will provide reports as directed by the CDRG.



3. The ESFG will arrange to provide selected damage assessment information to other ESFGs upon request. Standing requests for information should be submitted to this ESFG as soon as possible so that procedures can be developed for acquiring the information.

4. The regional response group in the region affected will develop supplemental damage assessment reports based upon State and local information and provide these to the ESFG.

5. Requests for aerial reconnaissance missions may come from the CDRG or the region. Requests from other sources will be coordinated with these organizations before being processed. The ESFG will coordinate the mission with the agency possessing the necessary assets. After the mission has been flown, the results will be disseminated in accordance with the requestor's guidance. These results also will be maintained at the ESFG to answer future requests for information. Figure 12.2 depicts the procedures for processing a request for aerial reconnaissance.

6. Requests for ground reconnaissance assistance will come from the region response group. Requests from other sources will be coordinated with the region before being processed. The ESFG will coordinate the request among its member agencies. One or more of the agencies then will provide the necessary resources for ground reconnaissance assistance. Their movement to the region will be coordinated with the region response group and, if required, the ESFG for Transportation. The region response group then will direct the use of these resources. Figure 12.3 depicts the procedures for processing a request for ground reconnaissance assistance.

7. Requests for information from the CDRG, other ESFGs, and the region response group will be honored. Requests from other organizations will be validated with one of these organizations before being processed.

8. The DoD representative to the ESFG will monitor availability of DoD aerial reconnaissance assets, inform the ESFG, and forward all requests for their employment. The DoE representative will have similar responsibilities for the DoE aerial measuring system.

9. All members of the ESFG will be aware of their parent organizations' capabilities to provide resources for ground reconnaissance activities.

**CDRG OR REGION  
RESPONSE GROUP**

**DAMAGE RECONNAISSANCE AND  
ASSESSMENT ESFG**

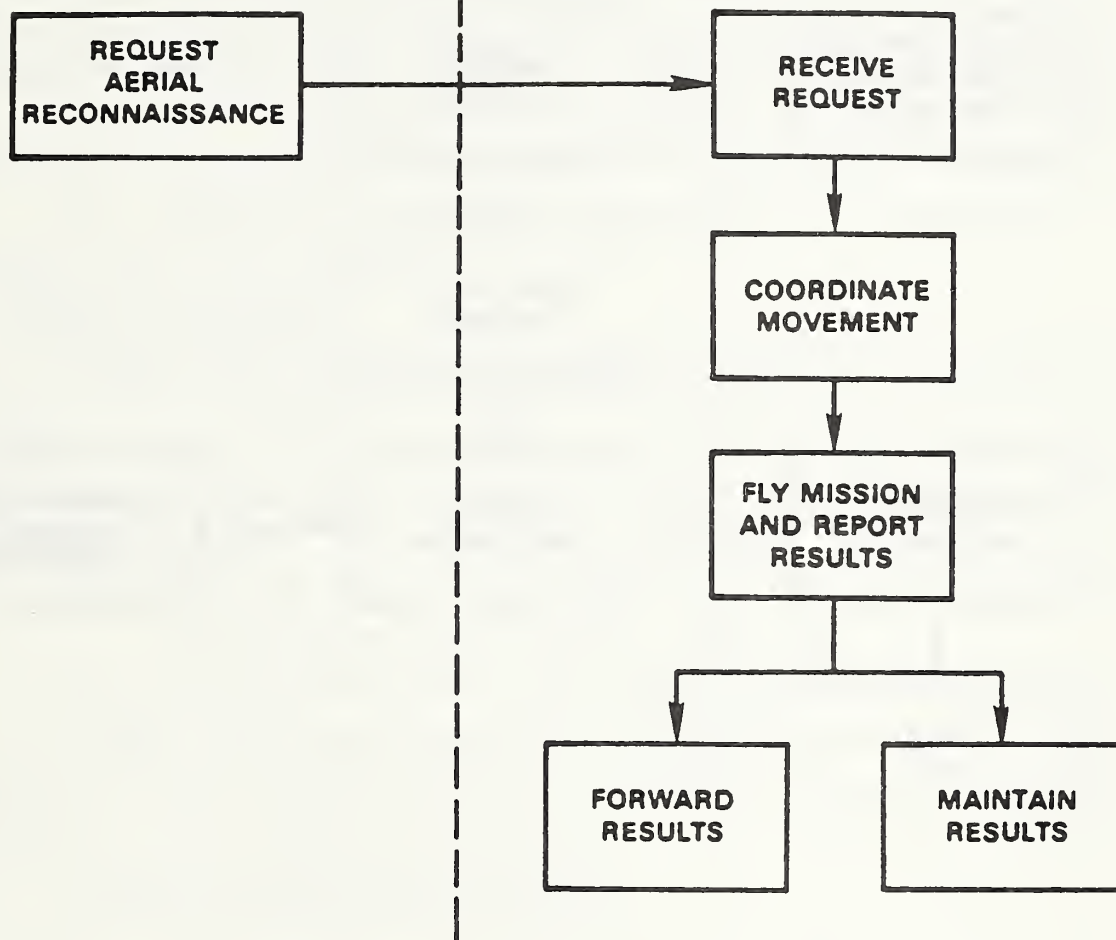


Figure 12.2. Procedures for Processing a Request for Aerial Reconnaissance

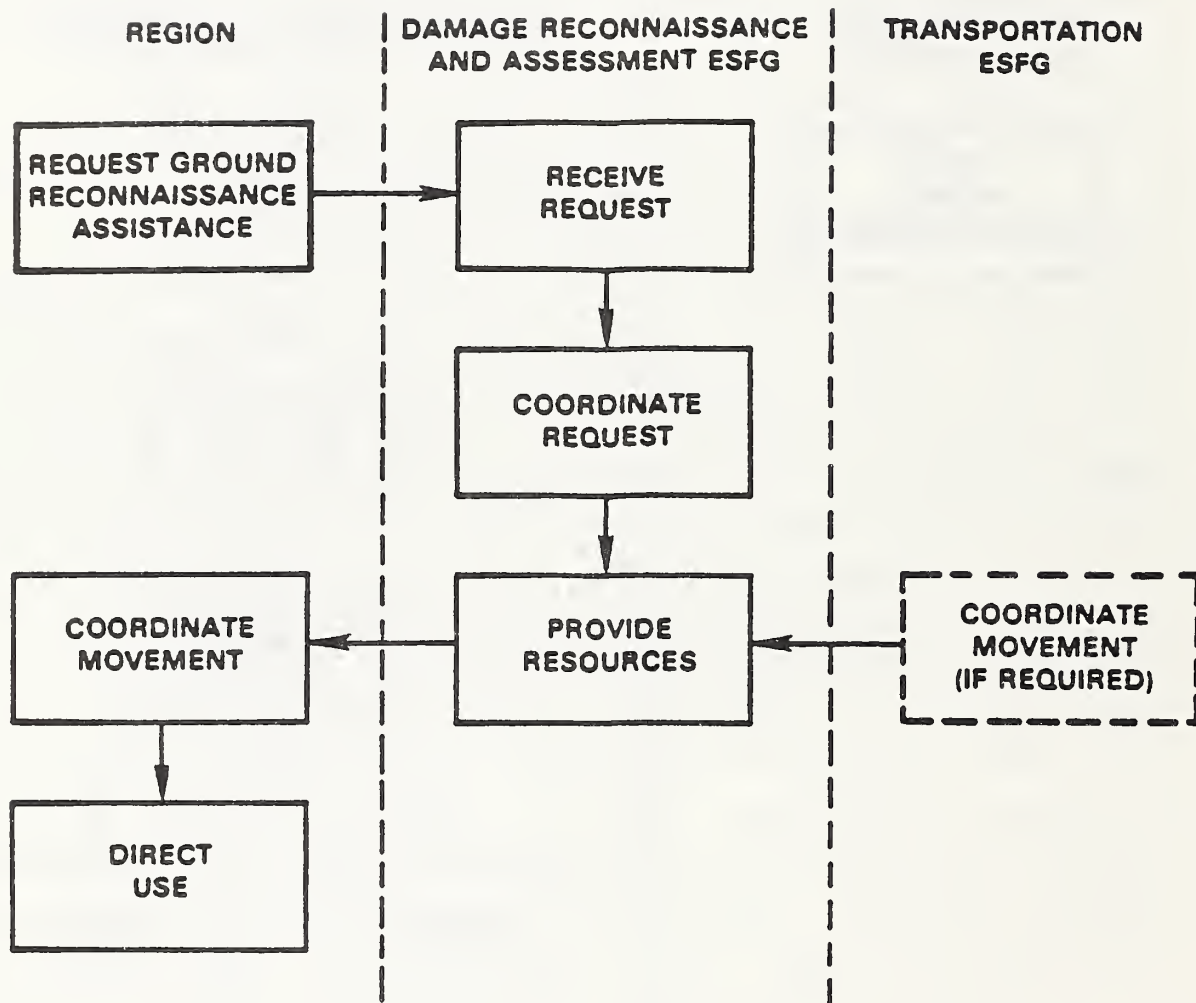


Figure 12.3. Procedures for Processing a Request for Ground Reconnaissance Assistance

10. Conflicts which cannot be resolved by the ESFG will be referred to the CDRG.

F. Coordination

1. The Chief, Public Assistance Division, SL-DA-PA-FEMA will be the ESFG's principal point of contact with the CDRG.

2. Movement of personnel into the disaster area will be accomplished in accordance with the Emergency Transportation Annex (ESF 1).

3. The ESFG will develop and promulgate information collection guidelines and procedures to enhance damage reconnaissance and assessment.

4. Updates and reviews of this annex will be accomplished in accordance with the Basic Plan.

V. RESOURCE REQUIREMENTS

A. Assets Critical for Initial 12 Hours. Immediately following the earthquake, the DoD and DoE should advise the ESFG of the availability of appropriate resources and their proximity to the affected area. The assets listed below will have a critical effect on the performance of the initial damage reconnaissance:

- (1) United States Air Force (USAF) reconnaissance aircraft and DoD photographic interpretation assets, and
- (2) DoE aerial measuring system, remote sensing resources.

B. Support for Field Activities. The American Society of Civil Engineers and similar organizations will be asked to provide volunteers to participate in damage assessment operations.

C. Support for Activities of the ESFG

1. FEMA will provide the administrative supplies, office space, communications, and support personnel for the ESFG.

2. The NCS will provide additional communication assets as required.

VI. TERMS AND DEFINITIONS

A. Aerial Measuring System (AMS). The AMS is maintained to provide a rapid response of resources for conducting remote sensing operations. AMS can provide extensive multispectral scanning, large format aerial photography, and airborne large-area radio metric surveys.

B. Public Assistance Division, State and Local Programs and Support Directorate, FEMA (SL-DA-PA-FEMA). The Public Assistance Division develops and administers policy and guidance that ensures the effective implementation of disaster relief programs to State and local governments.

VII. REFERENCES. Department of Defense Directive 3025.1, "Use of Military Resources During Peacetime Civil Emergencies within the United States, Its Territories, and Possessions," May 23, 1980, as amended.



### APPENDIX III

USGS Interim Emergency Plans for Earthquake Prediction and Response in  
the United States (Draft)

# USGS INTERIM EMERGENCY PLAN FOR EARTHQUAKE PREDICTION AND RESPONSE IN THE UNITED STATES

## Introduction:

Earthquakes have occurred throughout much of the United States. The western States of Alaska, California, Hawaii, Idaho, Utah, Nevada, New Mexico, Washington, and Wyoming have been particularly susceptible, but major earthquakes have also struck the eastern and central parts of the United States, particularly Arkansas, Missouri, Tennessee, Massachusetts, New York, and South Carolina. The effects of earthquakes can be widespread and devastating. Earthquake-generated ground shaking, in many cases, causes widespread damage, injuries, and loss of life, principally through failure of buildings. Earthquakes also trigger geologic processes such as surface faulting, landsliding and other types of ground failures, tsunamis and seiches, and regional vertical movements; each process can cause property damage, injuries, and loss of life.

Since 1977, the USGS has participated in the National Earthquake Hazards Reduction Program. The goal of this program is to reduce the loss of lives and property due to earthquakes, through the reliable prediction of time, place, and size of earthquakes and the assessment of earthquake hazards and risk in those areas considered to be most susceptible to earthquakes. The participation of the USGS in the National Earthquake Hazards Reduction Program is concentrated in the Office of Earthquake Studies, a part of the Geologic Division.

USGS authorities and responsibilities relative to earthquake hazards

Under the Organic Act of 1879 and the Federal Disaster Relief Act of 1974, the USGS has general and broad authority to identify geologic hazards, to notify appropriate Federal, State, and local authorities of these hazards, and to provide

information as necessary to insure that timely and effective warning of potential disasters is provided. Additionally, under the 1980 reauthorization of the "1977 Earthquake Hazards Reduction Act," the Director of the USGS has authority to issue an earthquake advisory or prediction as deemed necessary.

#### USGS hazard warning procedures

The USGS has established general warning procedures for geologic hazards; these procedures are documented in the Federal Register. The procedures are titled, "Warning and Preparedness for Geologic-Related Hazards" and are dated April 12, 1977. It has also adopted an emergency response plan for volcanic hazards in the United States (Open File Report No. 81-123). The hierarchy of warnings adopted by the USGS in its general plan, and the role of the USGS are as follows:

1. Notice of Potential Hazard—to provide information on the location and possible magnitude of a potentially hazardous geologic event, process or condition.
2. Hazard Watch—to provide current information as it develops from monitoring or from observing precursors that a potentially hazardous event of a generally predictable magnitude may be imminent in a general area or region and within an unspecified period of time (possibly months or years).
3. Hazard Warning (Prediction)—to provide information about the time (possibly days or hours), location, and magnitude of a potentially hazardous geologic event.

These interim emergency plans for predicted and destructive earthquakes are developed in the context of the existing USGS hazard warning procedures (Appendixes A and B) and the emergency response plan for volcanic hazards. Background information is contained in Appendix C.

## USGS organizational structure

The organizational structure of the USGS, relative to earthquake studies and research, is shown in Figure 1. Line authority flows from the Director to the Chief Geologist to the Chief of the Office of Earthquake Studies to the various branches in that Office. The National Earthquake Information Service is an element of the Branch of Global Seismology. On the staff of the Chief of the Office of Earthquake Studies are managers of the Earthquake Prediction and Earthquake Hazards and Risk Assessment programs. Persons holding these positions play key roles in the earthquake prediction and earthquake response plans, respectively.

### Purpose:

The purpose of this document is to: describe Earthquake Prediction and Earthquake Response Plans for the USGS, describe the functions and responsibilities of various elements and participants in the plans, and identify the key personnel (by office and name) who are responsible for executing these plans.

### General Response Structure:

The Director of the USGS or his designee, is authorized to implement these plans. He has ultimate responsibility for their execution and authority to alter the plans as required. Upon activation of these plans, the Bureau Emergency Response Coordinator (BERC) assumes responsibility for their execution and all of their elements (see Figure 2). He assembles and is assisted by the Survey Coordination Team and is the focal point for coordination between the field teams and the USGS Headquarters. Depending on the circumstances, either field team (the Prediction Response Team or the Earthquake Response Team) or both may be activated. Each field team consists of three groups with responsibilities for: 1) gathering and analyzing field data; 2) evaluating geologic hazards associated with the predicted



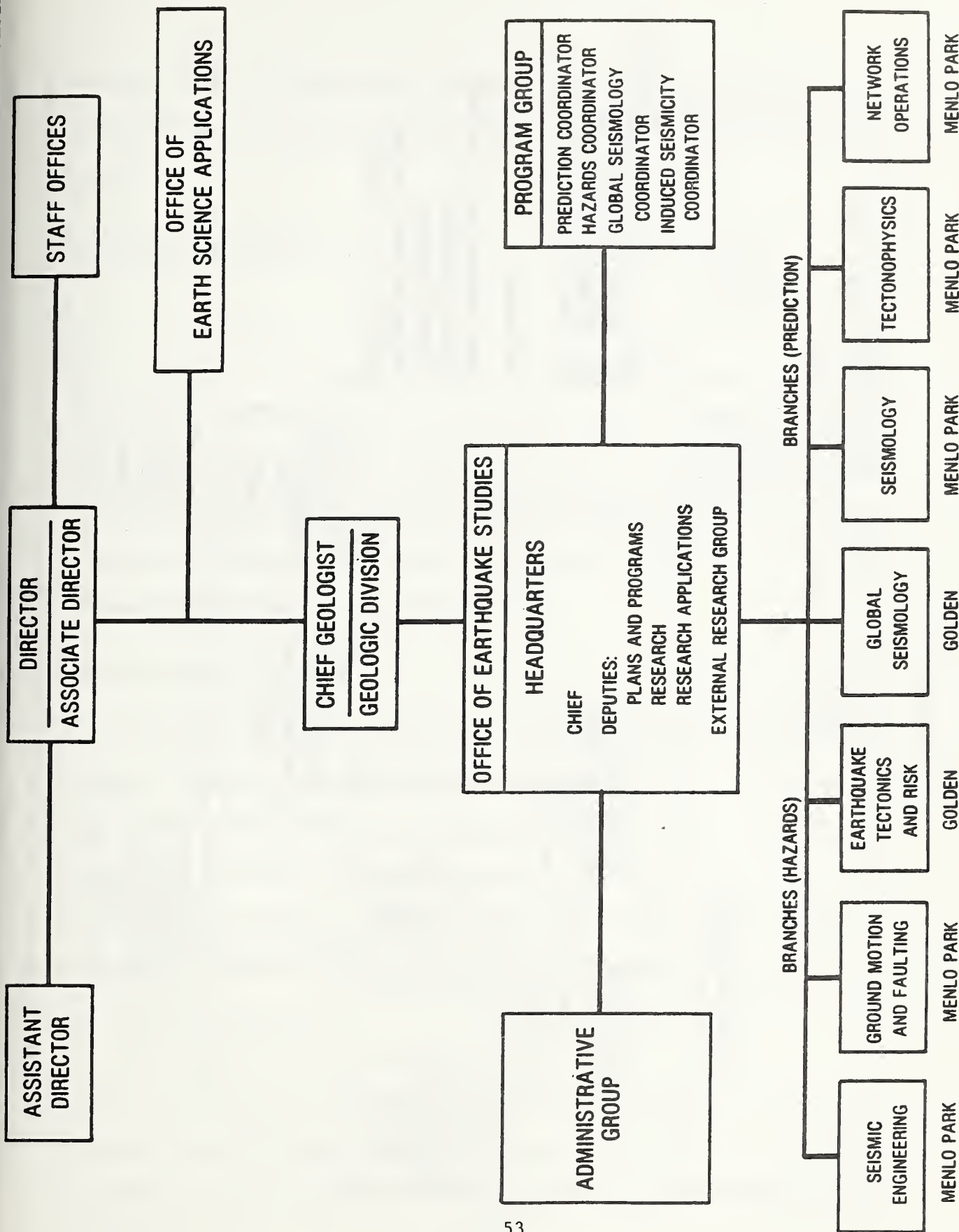


Figure 1. --- Organization chart of the USGS relative to earthquake studies and research



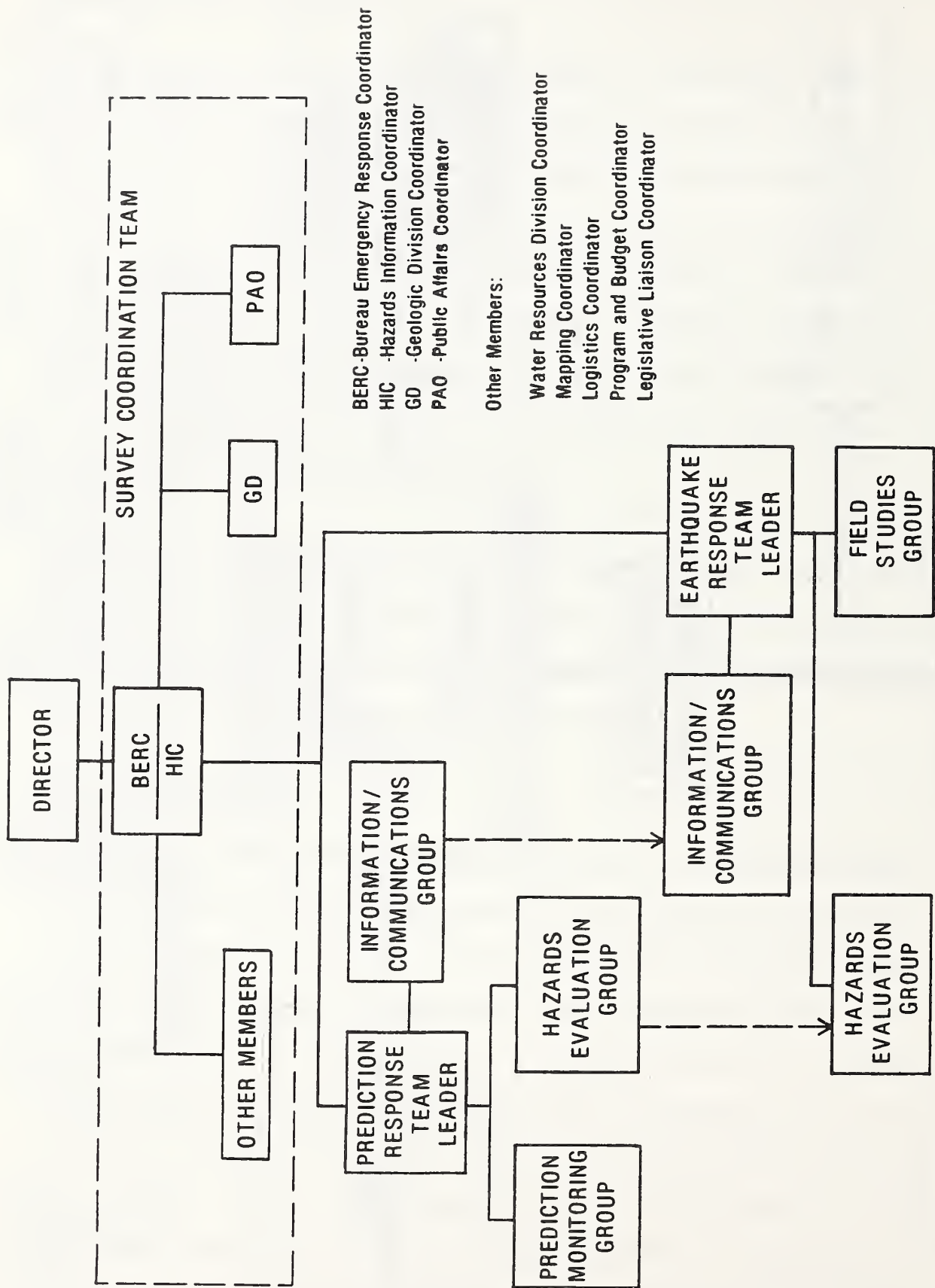


Figure 2.--Organization chart of the USGS relative to response to earthquake prediction and/or a major earthquake.

earthquake or the earthquake that has occurred; and 3) maintaining field information centers and communications links. Their structure is shown graphically in Figure 2.

### Prediction Response Plan:

#### Activation of the Plan

Survey personnel will continue to follow the Bureau's guidelines for reporting potential hazards, including the prediction of an earthquake. These procedures are given in Appendixes A and B of this report. Once an earthquake prediction has been issued by the USGS, the Director decides whether or not to activate the Prediction Response Plan. If the predicted earthquake is small or in an unpopulated area, the plan may not be activated.

#### USGS Headquarters (BERC)

Upon the Director's decision to carry out the Prediction Response Plan, the Bureau Emergency Response Coordinator assumes responsibility for the execution of the plan and all of its elements. He assembles the Survey Coordination Team and contacts the Prediction Response Team leader, and activates that team. The Bureau Emergency Response Coordinator is the key communication link between the Prediction Response Team leader and the Director of the USGS.

#### Prediction Response Team

Upon activation of the Prediction Response Plan, the leader of the Prediction Response Team establishes a field headquarters at the most reasonable and convenient facility. He then serves as the primary scientific evaluator of the

progress of the prediction and as the primary field contact with the Bureau Emergency Response Coordinator at the USGS Headquarters. He is assisted by a Prediction Monitoring Group, a Hazards Evaluation Group, and an Information/Communications Group. The field headquarters issues periodic updates of the prediction, gives advice on geologic hazards that will be associated with the predicted earthquake, and is a local information and communication center. The field headquarters is maintained until the predicted earthquake occurs or the prediction is withdrawn by the Director of the USGS.

### Earthquake Response Plan

#### Activation of the Plan

The National Earthquake Information Service (NEIS) routinely and immediately notifies the Chief of the Office of Earthquake Studies (OES), or one of his deputies, and the Public Affairs Office of any earthquake felt in the United States or any earthquake of magnitude 6.5 or greater worldwide. At his discretion, the Chief of the Office of Earthquake Studies immediately notifies the Director or his staff of any significant earthquake in the United States or any major earthquake worldwide. The Public Affairs Office routinely issues statements concerning newsworthy earthquakes to the media. For many of these earthquakes the Office of Earthquake Studies, at its own initiative, dispatches a field group to study the effects of the earthquake and to gather purely scientific data (see Appendix C, page 38). A disastrous earthquake that occurs in the United States may cause the Director to activate the Earthquake Response Plan.

#### USGS Headquarters (BERC)

Upon the Director's decision to carry out the Earthquake Response Plan, the Bureau Emergency Response Coordinator assumes responsibility for the execution

of the plan and all of its elements. He assembles the Survey Coordination Team, contacts the Earthquake Response Team leader, and activates the team. The Bureau Emergency Response Coordinator is the key communications link between the Earthquake Response Team leader and the Director of the USGS.

### Earthquake Response Team

Upon activation of the Earthquake Response Plan, the leader of the Earthquake Response Team establishes a headquarters at the most convenient and practical facility, establishes and maintains contact with the Bureau Emergency Response Coordinator, and serves as the leader of the Field Studies, Hazards Evaluation and Information/Communications Groups. The field headquarters directs and coordinates scientific studies, issues information and assessments of increased geologic hazards resulting from the earthquake, and serves as a local information and communications center. The field headquarters is maintained until the Director deactivates the Earthquake Response Plan.

### Functions and Responsibilities of the Organizational Units and Individuals in the Earthquake Prediction and Response Plans:

Functions and Responsibilities of the Bureau Emergency Response Coordinator and the Survey Coordination Team:

The Bureau Emergency Response Coordinator, the Hazards Information Coordinator and the Survey Coordination Team (Figure 2) provide headquarters support and guidance, and resolve policy issues that cannot be dealt with at the field level. All members of the Survey Coordination Team will be available for their particular expertise and will participate equally in policy deliberations. It is anticipated that the four individuals specifically delineated within the team (Figure 2) generally will interact much more frequently for earthquake-related



hazards than the "other members". This situation could change if, for instance, a major dam, river or aquifer were damaged by an earthquake with the consequent increased participation of the Water Resources Division. The functions and responsibilities of the individual members are:

A. Bureau Emergency Response Coordinator:

The Bureau Emergency Response Coordinator is responsible for the execution of the Prediction and Earthquake Response Plans. He is assisted and advised by the Hazards Information Coordinator and the Survey Coordination Team composed of representatives from the Director's Office and from the appropriate divisions. The Bureau Emergency Response Coordinator is the primary conduit for communications between the Director and the Response Team Leaders and facilitates and expedites the work of the Response Team Leaders by providing headquarters support and resolving policy issues or other major problems. He is the Director's representative at headquarters to DOI and to other Federal agencies in matters which involve coordination or policy issues germane to the Geological Survey's response to the specific disaster or predicted disaster.

Hazards Information Coordinator:

The Hazards Information Coordinator acts as the Deputy to the Bureau Emergency Response Coordinator and as such maintains close communication with the field team leader. He is responsible for maintaining a current record of events, an action file of prioritized problems or needs, and a continuously updated list of Response Plan participants, their alternates, and their home and office telephone numbers. The Hazards Information Coordinator acts for the Bureau Emergency Response Coordinator in the latter's absence.



B. Survey Coordination Team:

Geologic Division Coordinator:

The Geologic Division Coordinator, who is the Chief of the Office of Earthquake Studies, provides critical technical information to the Bureau Emergency Response Coordinator and keeps the latter informed of resource needs. He assists in the resolution of policy level problems and maintains a continuously updated list of Emergency Plan participants from the Geologic Division which he transmits to the Hazards Information Coordinator.

Public Affairs Office Coordinator:

The Public Affairs Office Coordinator is responsible for the coordination of news media services, contacts with news media, arranging news interviews with appropriate USGS personnel, preparation of news releases and news photos, advising USGS officials of news media needs and possible reactions to anticipated events, and coordinating news-related activities. The Public Affairs Office Coordinator will maintain a reference file of issued news releases and samples of resulting news clippings.

Other Members of the Survey Coordination Team:

Divisional Coordinators for Water Resources and National Mapping Divisions

The divisional coordinators provide linkage between their representatives on the Response Teams and their headquarters staff. They assist the Bureau Emergency Response Coordinator in identifying resource needs and in resolving policy level problems. They are responsible for maintaining a

continuously updated list of Emergency Response Plan participants from their divisions, which they transmit to the Hazards Information Coordinator.

#### Logistics Coordinator, Administrative Division:

The Logistics Coordinator from the Administrative Division is responsible for all logistical, personnel, and associated administrative requirements of the Prediction or Earthquake Response teams. He coordinates the activities of the administrative staffs of the Geologic Division and the Office of Earthquake Studies, as they will be the ones most likely called upon to provide the required services. The Logistics Coordinator is responsible for supplying all Response Plan personnel in advance with documents and funding sufficient to expedite their movement to the site on short notice.

#### The Program and Budget Coordinator:

The Program and Budget Coordinator provides assistance in developing strategies for funding emergency operations which cannot be anticipated in the Geological Survey's Budget. In addition, the Program and Budget Coordinator coordinates the preparation of requests for supplementary funds to compensate for funds expended as a result of a natural disaster (as in the case of Mount Saint Helens).

#### Legislative Liaison Coordinator:

The Legislative Liaison Coordinator is responsible for providing communication between the Bureau Emergency Response Coordinator and Congress and specifically with the Congressional delegation(s) from the area affected and for alerting the Bureau Emergency Response Coordinator to special requests for information or briefing materials.

## Functions and responsibilities of Prediction Response Team:

Once an earthquake prediction has been issued by the Director of the Geological Survey, the Survey Coordination Team headed by the Bureau Emergency Response Coordinator will be formed at the Reston, Virginia, headquarters. The Earthquake Prediction Response Team will immediately be activated. This team will be formed in a structure similar to that indicated in the Volcanic Hazards Emergency Response Plan. The leader of the Prediction Response Team will report directly to the Bureau Emergency Response Coordinator. The Chief of the Office of Earthquake Studies will be the Geologic Division Coordinator, working closely with the Survey Coordination Team.

The Prediction Response Team will consist of three groups: a Prediction Monitoring Group, a Hazard Evaluation Group, and a Prediction Information/Communication Group. The functions of these groups are outlined briefly below.

### Prediction Monitoring Group

The function of the Prediction Monitoring Group will be strictly scientific. Its role will be to continually evaluate and update the data on which the prediction is based and to advise the Prediction Team Leader of any changes in the observed data which might lead to a change in or withdrawal of the earthquake prediction. The Prediction Monitoring Group will operate on a 24-hour basis and will set up its headquarters at the nearest or most convenient facility in the region for which the earthquake prediction has been issued. The group leader will be the Chief of the Branch of Tectonophysics. A deputy group leader will be assigned. The staff for this group will be made up chiefly of members of the Branches of Tectonophysics and Seismology within the Office of Earthquake Studies, but scientists from other units also may be called in to assist. The Prediction Monitoring Group will study the data and continuously evaluate the scientific basis of the prediction that has been issued.

## Hazard Evaluation Group

The purpose of the Hazard Evaluation Group is to continuously evaluate the status of possible geologic hazards associated with the specific earthquake that has been predicted. This group will forward its findings to the Prediction Response Team Leader and the Information/Communications Group. The Hazard Evaluation Group will also be available to answer technical inquiries from officials responsible for public health and safety; such inquiries will be channeled through the Information/Communications Group. For example, the Hazard Evaluation Group could issue statements on areas that are likely to experience strong ground shaking, predict the expected level of ground shaking, and delineate those areas where surface faulting could occur. If the earthquake is in the western United States, the Hazard Evaluation Group will be led by the Chief of the Branch of Ground Motion and Faulting within the Office of Earthquake Studies. If in the eastern United States, the group will be led by the Chief of the Branch of Earthquake Tectonics and Risk. This group will operate on a 24-hour-a-day basis during the period that the prediction is in effect. The leader of this group will also have a deputy and will develop a staff by drawing members from the Branches of Ground Motion and Faulting and Earthquake Tectonics and Risk in the Office of Earthquake Studies, as well as from other organizational units. If the predicted earthquake occurs, this group will be transferred intact from the Prediction Response Team to the Earthquake Response Team.

## Information/Communications Group

The chief functions of this group are: 1) to establish and maintain communications between the Team Leader and the Survey Coordination Team at the USGS headquarters, and 2) to assist the Team Leader in dealing with the news media, local, State, and other Federal agencies, the Public Affairs Coordinator, and other



legitimate information requirements. This group will be established at the same location as the Prediction Response Team Leader or the Earthquake Response Team Leader. In case a major earthquake occurs for which the Prediction Response Team had been established, the Information/Communications Group will be transferred intact from the Prediction Response Team to the Earthquake Response Team. The Information/Communications Group should contain a communications specialist, representatives of the Public Affairs Office and the Hazards Information Coordinator's Office, and sufficient personnel to man a communications center on a 24-hour basis. This group will be required to establish a communications center at the location of the respective Team Leader. This center will establish and maintain communications with various field elements of the Prediction and Earthquake Response Teams and with the USGS Headquarters. After a major earthquake, normal communication facilities may be inoperative or saturated. This group should have alternate means of communications, such as shortwave radio, for communication with field parties and USGS Headquarters.

The communications center will also serve as the central point for requests for assistance, specific hazards evaluations, and information or interviews. In this function this group will take the burden of these contacts off the Team Leader and working scientists. Evaluations of specific hazards (possible dam failures, rock-slides, etc.) can be made in the field directly between designated members of the Hazard Evaluation Group and appropriate local officials. The Information/Communications Group will receive and consolidate requests for hazards evaluation and information and pass such requests on to the Team Leader. They will also receive and consolidate information being obtained by the other Response Team groups in order to provide a continuous flow of needed information to headquarters, other agencies, and the media.



If an earthquake is declared a national disaster by the President, this group will provide liaison between the Federal coordinator, who is appointed by the President to manage relief efforts, and the leader of the Hazard Evaluation Group. Another major function of the Information Communications Group will be in dealing with the media. The group will contain a representative of the Public Affairs Office who will draft press releases, arrange interviews and press conferences, and provide information transmission services for the team. Although press releases and other information must be cleared by the Team Leader, the Information/Communications Group should relieve the Team Leader of the heavy demands by the press and others that follow a major earthquake.

#### Functions and responsibilities of the Earthquake Response Team:

The Earthquake Response Team will consist of a Field Studies Group, primarily directed toward gathering scientific data, a Hazard Evaluation Group, and an Information/Communications Group. The leader of the Earthquake Response Team activates the three groups within his team (if not already activated due to the occurrence of a predicted earthquake), establishes a field headquarters, directs and coordinates all field activities, serves as the primary USGS representative in the field, and establishes and maintains contact with USGS headquarters.

#### Field Studies Group

Upon activation, the person designated as leader of the Field Studies Group will immediately consult with the leader of the Earthquake Response Team to determine the nature of the response and the funding that will be allocated for research activities. Together, they will identify and assign responsibilities to USGS scientists, engineers, and technicians who are available to participate in the field studies. The leader of the Field Studies Group will coordinate all scientific field investigations by the USGS of geologic, seismological, and engineering effects such

as: surface faulting, landslides, liquefaction, distribution of damage, recording of aftershocks, and the acquisition of strong ground motion records. The leader of the Field Studies Group coordinates USGS data-gathering activities with other field research units from universities, the Earthquake Engineering Research Institute, and State engineers, and will communicate preliminary results of field investigations to the Earthquake Response Team leader and to other field teams. The Earthquake Response Team leader will be responsible for passing this information in turn to USGS management, other Federal agencies, and State and local government officials. The Earthquake Response Team leader will provide the local USGS Public Affairs Officer with earthquake information for public release.

#### Hazard Evaluation Group

If the earthquake was predicted, this group may be in place under the Prediction Response Team. The purpose of the earthquake Hazard Evaluation Group is to continuously evaluate the status of possible geologic hazards associated with the earthquake. This group will forward its finding to the Earthquake Response Team Leader and the Information/Communications Group. The earthquake Hazard Evaluation Group will also be available to answer technical inquiries from officials responsible for public health and safety; such inquiries will be channeled through the Information/Communications Group. The Hazard Evaluation Group will identify and give advice on mitigating geologic hazards directly associated with the earthquake or its aftershocks. While the mission of the Field Studies Group is to gather scientific data and observations, that of the Hazard Evaluation Group is to identify geologic hazards arising from the earthquake and to advise Federal, State, and local officials responsible for mitigating or reducing the effects of these hazards. The leader of the Hazard Evaluation Group may direct the leader of the Field Studies Group to assist in evaluating specific hazards.

## Information/Communications Group

If the earthquake was predicted, this group may be in place under the Prediction Response Team. The chief functions of this group are: 1) to establish and maintain communications between the Team Leader and the Survey Coordination Team at the USGS headquarters, and 2) to assist the Team Leader in dealing with the news media, local, State, and other Federal agencies, the Public Affairs Coordinator, and other legitimate information requirements. This group will be established at the same location as the Earthquake Response Team Leader. In case a major earthquake occurs for which the Prediction Response Team had been established, the Information/Communications Group will be transferred intact from the Prediction Response Team to the Earthquake Response Team. The Information/Communications Group should contain a communications specialist, representatives of the Public Affairs Office, and the Hazards Information Coordinator's Office, and sufficient personnel to man a communications center on a 24-hour basis. This group will be required to establish a communications center at the location of the Team Leader. This center will establish and maintain communications with various field elements of the Earthquake Response Team and with the USGS Headquarters. After a major earthquake, normal communication facilities may be inoperative or saturated. This group should have alternate means of communications, such as shortwave radio, for communication with field parties and USGS Headquarters.

The communications center will also serve as the central point for requests for assistance, specific hazards evaluations, and information or interviews. In this function this group will take the burden of these contacts off the Team Leader and working scientists. Evaluations of specific hazards (possible dam failures, rock-slides, etc.) can be made in the field directly between designated members of the

Hazard Evaluation Group and appropriate local officials. The Information/Communications Group will receive and consolidate requests for hazards evaluation and information and pass such requests on to the Team Leader. They will also receive and consolidate information being obtained by the other Response Team groups in order to provide a continuous flow of needed information to headquarters, other agencies, and the media.

If an earthquake is declared a national disaster by the President, this group will provide liaison between the Federal coordinator, who is appointed by the President to manage relief efforts, and the leader of the Hazard Evaluation Group. Another major function of the Information/Communications Group will be in dealing with the media. The group will contain a representative of the Public Affairs Office who will draft press releases, arrange interviews and press conferences, and provide information transmission services for the team. Although press releases and other information must be cleared by the Team Leader, the Information/Communications Group should relieve the team leader of the heavy demands by the press and others that follow a major earthquake.



## Identification of Key Personnel and Summarization of Their Chief Responsibilities:

Table 1 summarizes the actions required by various events and the persons (by office) with responsibility for communications, decisions, or execution of the various plans.

### Communication Procedure for Notifying the Responsible USGS Personnel of an Earthquake Prediction or of a Major Disastrous Earthquake

#### Prediction

If an earthquake prediction is issued by the Director of the Geological Survey, the Governor of the State or States involved and the Director of FEMA must be notified immediately (see Figure 3). This notification will be carried out by the Hazards Information Coordinator who will in turn notify the Bureau Emergency Response Coordinator and Regional Assistant Director. The Bureau Emergency Response Coordinator will notify the Associate Director, the Chiefs of the Geologic Division and the Water Resources Division, the Public Affairs Officer, and the Prediction Response Team Leader. The Regional Assistant Director will notify the Regional Geologist, Hydrologist, and Management Officer. The Prediction Response Team Leader will notify the leaders of the groups within his team.

#### Major Earthquake

For major earthquakes within the United States, NEIS transmits a telex message to various addresses (see Figure 5), one of which is the Chief, Office of Earthquake Studies (OES). The Chief, OES, is also called directly by telephone. He in turn contacts the Director, and a decision concerning implementing the Earthquake Response Plan is made. If this is decided, the Chief, OES, will contact the Hazards Information Coordinator and the Regional Assistant Director. These individuals make contacts as shown in Figure 3.



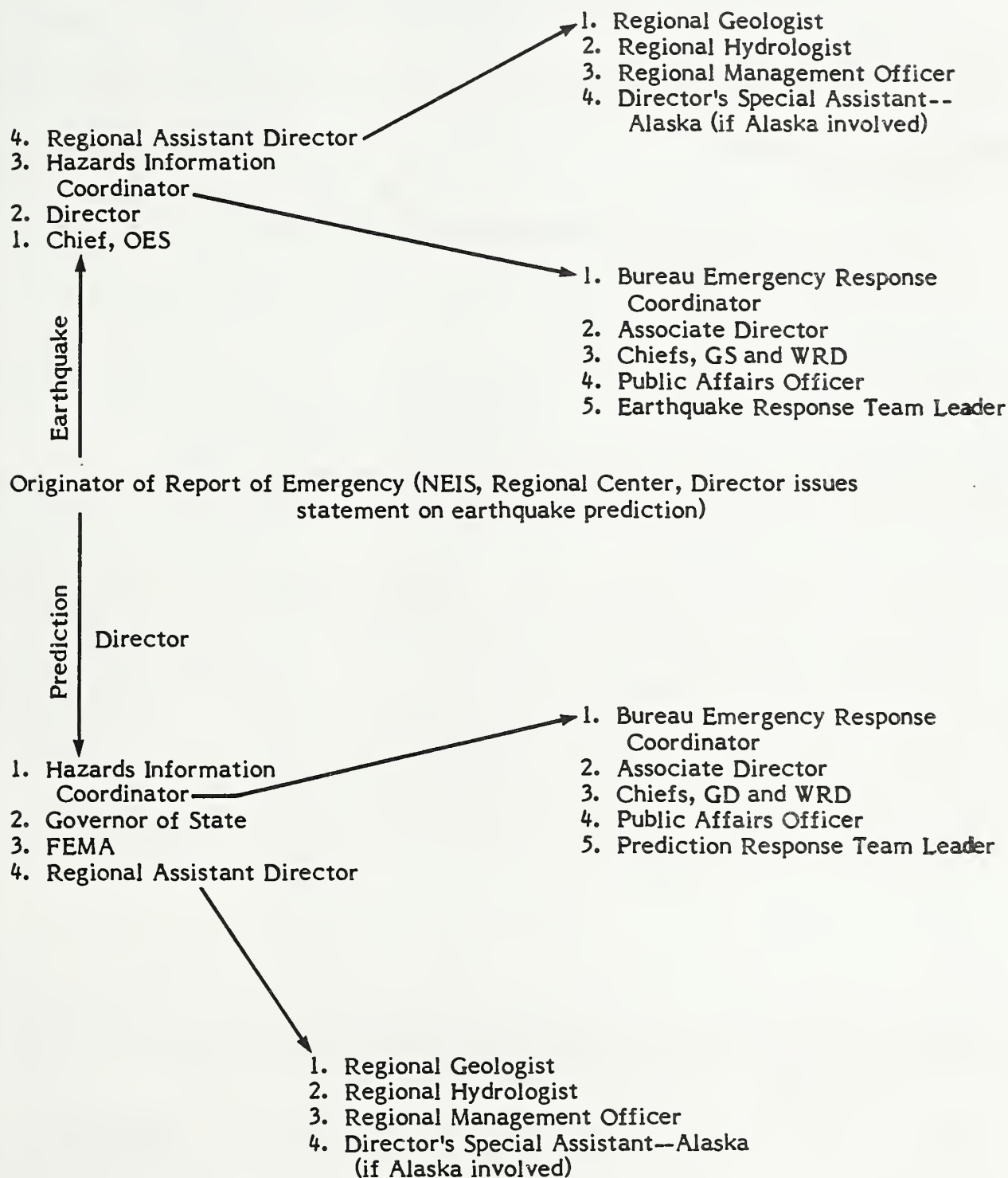
Table 1--SUMMARY OF EVENTS, ACTIONS, AND RESPONSIBLE OFFICIALS

<u>EVENT</u>	<u>ACTION</u>	<u>RESPONSIBLE OFFICIAL</u>
Non-disastrous earthquake in United States/or above magnitude 6.5 worldwide	NEIS issues message and notifies Chief, OES and PAO	Chief, Branch of Global Seismology
	Director notified at discretion of Chief, OES	Chief, OES
	Decision to dispatch field group to epicentral area	Chief, OES
	Organization and coordination of field group	Program Manager, Earthquake Hazards and Risk Assessment Program
	Direction of field group	Chief, Branch of Ground Motion and Faulting (WUS); Chief, Branch of Earthquake Tectonics and Risk (EUS)
Earthquake prediction issued by U.S.G.S.	Activation of Prediction Response Plan	Director
	Execution of Prediction Response Plan	BERC
	Activation and direction of Prediction Response Team	Program Manager, Earthquake Prediction Program
	Activation and direction of Prediction Monitoring Group	Chief, Branch of Tectonophysics
	Activation and direction of Hazards Evaluation Group	Chief, Branch of Ground Motion and Faulting (WUS); Chief, Branch of Earthquake Tectonics and Risk (EUS)
NEIS--National Earthquake Information Service OES--Office of Earthquake Studies PAO--Public Affairs Office	WUS--Western U.S. EUS--Eastern U.S. BERC--Bureau Emergency Response Coordinator	

Table 1 (continued)--SUMMARY OF EVENTS, ACTIONS, AND RESPONSIBLE OFFICIALS

<u>EVENT</u>	<u>ACTION</u>	<u>RESPONSIBLE OFFICIAL</u>
Disastrous earthquake in United States (fatalities and heavy damage)	Activation and Direction of Informational/Communications Group	Chief, Branch of Network Operations
	NEIS issues message and notifies Chief, OES	Chief, Branch of Global Seismology
	Chief, OES, notifies Director and Hazards Information Coordinator	Chief, OES
	Decision to activate Earthquake Response Plan	Director
	Execution of Earthquake Response Plan	BERC
	Activation and direction of Earthquake Response Team	Program Manager, Earthquake Hazards and Risk Assessment Program, OES
	Activation and direction of and Field Studies Group	Chief, Branch of Ground Motion Faulting
	Activation and direction of Hazards Evaluation Group	Chief, Branch of Earthquake Tectonics and Risk
	Activation and direction of Information/Communication Group	Chief, Branch of Network Operations

Figure 3—Summary of USGS Communication Network  
for Earthquake Prediction and Response



U.S. DEPT. OF COMM. <b>BIBLIOGRAPHIC DATA SHEET</b> (See instructions)	<b>1. PUBLICATION OR REPORT NO.</b> NBSIR 85-3123	<b>2. Performing Organ. Report No.</b>	<b>3. Publication Date</b> March 1985
<b>4. TITLE AND SUBTITLE</b> Guidelines for ICSSC Post-Earthquake Response Activities			
<b>5. AUTHOR(S)</b> R. D. Marshall			
<b>6. PERFORMING ORGANIZATION</b> (If joint or other than NBS, see instructions)  NATIONAL BUREAU OF STANDARDS DEPARTMENT OF COMMERCE WASHINGTON, D.C. 20234			<b>7. Contract/Grant No.</b>  <b>8. Type of Report &amp; Period Covered</b>
<b>9. SPONSORING ORGANIZATION NAME AND COMPLETE ADDRESS</b> (Street, City, State, ZIP) Federal Emergency Management Agency Washington, DC 20472			
<b>10. SUPPLEMENTARY NOTES</b>  <input type="checkbox"/> Document describes a computer program; SF-185, FIPS Software Summary, is attached.			
<b>11. ABSTRACT</b> (A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here)  The National Plan for Federal Response to a Catastrophic Earthquake is reviewed and actions that can be taken by the Interagency Committee on Seismic Safety in Construction (ICSSC) in support of the National Plan are identified. An essential element in the development of earthquake hazard reduction measures for use in Federal construction programs is the detailed assessment of geologic, seismological and engineering factors through post-earthquake investigations. It is concluded that many of the problems and much of the cost associated with the planning for post-earthquake investigations can be avoided by making ICSSC response activities an integral part of the National Plan. This approach can provide valuable technical assistance to Federal agencies adversely affected by a catastrophic earthquake and to those agencies responsible for implementing the National Plan. Steps that must be taken by the ICSSC to establish a workable response structure and to ensure the timely conduct of post-earthquake investigations are outlined.			
<b>12. KEY WORDS</b> (Six to twelve entries; alphabetical order; capitalize only proper names; and separate key words by semicolons) Buildings; codes; design criteria; disasters; earthquakes; seismicity; structural engineering.			
<b>13. AVAILABILITY</b>  <input checked="" type="checkbox"/> Unlimited <input type="checkbox"/> For Official Distribution. Do Not Release to NTIS <input type="checkbox"/> Order From Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.  <input checked="" type="checkbox"/> Order From National Technical Information Service (NTIS), Springfield, VA. 22161			<b>14. NO. OF PRINTED PAGES</b> 81  <b>15. Price</b> \$11.50





